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Planned Cities—III—Nancy

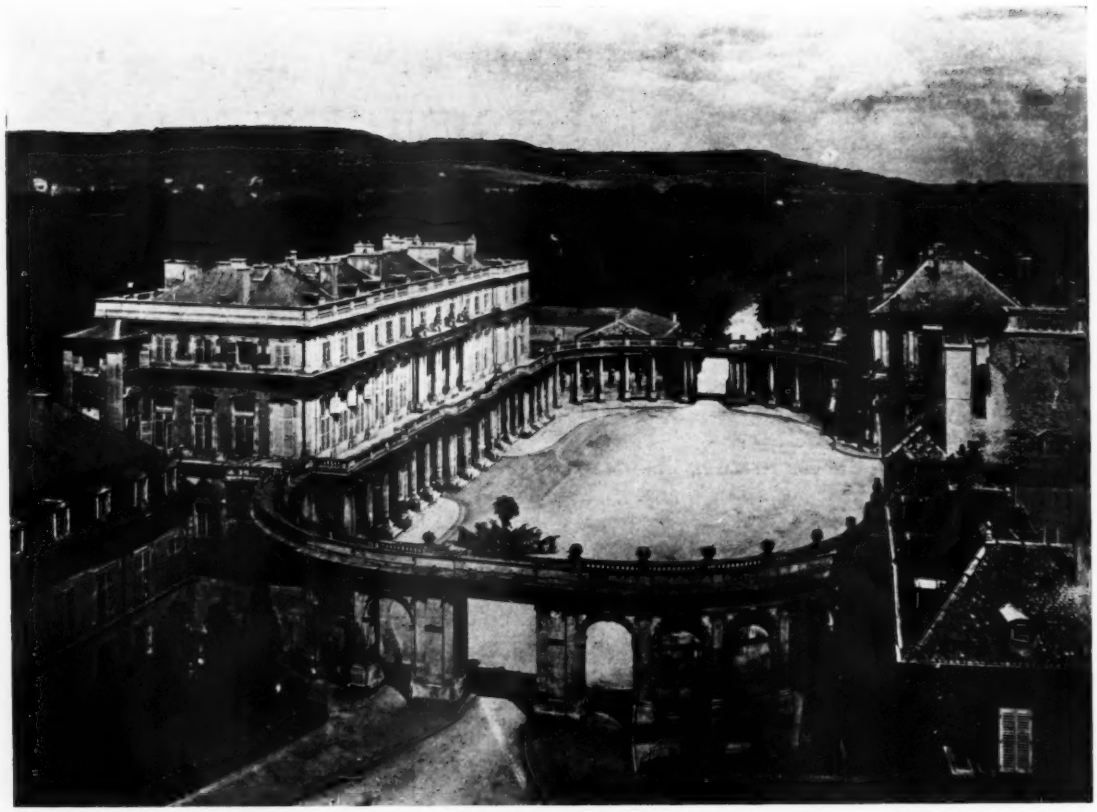
NANCY is certainly one of the most beautiful towns in France. Some, indeed, might go further and place it high amongst the towns of Europe, but it is essentially a town in which the architect will delight, owing none of its charm to its natural position, to some wondrous and dominating building, to a picturesque confusion, or to the dress and manners of its inhabitants. The particular beauty of Nancy, of its streets, its squares, and its buildings, is like that of precious gems in a piece of exquisite jewelry that are rightly subordinated and related to each other.

The predominating impression of Nancy is of an eighteenth century town, and indeed it does, in common with half the towns in Europe, owe most of its present form to the labor of that great town-building epoch. Actually, however, Nancy comprises three towns successively juxtaposed, and now, as it were, compressed into a whole like laminated stratæ. The first town lies centrally between the Cours Léopold and the gardens of the Pépinière; the second is the Nancy of the seventeenth and eighteenth century and has as its center the Place Stanislas, and lastly there is the new town which has grown up since 1820, owing to the influx of Alsatians.

The history of Nancy may be said to begin when Odelric defied the joint episcopal assaults of the bishops of Metz and Trèves at the end of the eleventh century. Soon after these events the town was strongly fortified and became the capital of the Dukes of Lorraine, increasing in importance until Charles the Bold, coveting it, met his death at its gates before the victorious René II. Then there continued the long line of the Dukes of Lorraine. Under Charles the Great the prosperity of the town increased and new fortifications were built. When he died in 1608, his subjects showed their respect by inaugurating vast and pompous obsequies which continued for sixty-four days. In 1633 Nancy, still coveted by the French, was besieged by Louis XIII, and taken, but the peace of Ryswick restored it to Duke Léopold, who began the central development of the city which reached its climax under Stanislas Lesczynski, the ex-King of Poland, and the last of the Dukes of Lorraine, for on his death in 1766, it became a French province.

The ordered beauty of Nancy, therefore, is preeminently the result of an autocracy, in this respect resembling the numerous German Court towns which developed so beautifully during the same period and from the same causes. For these princes and dukes gathered to their courts all the men of skill and brilliance. Each endeavored, indeed, to emulate the splendor of the Court of France. It was a period of vigorous Court etiquette, but it was a period, too, when the arts received scope and patronage. Thus it comes about that Nancy is French in architecture but German in spirit (is it then by more than coincidence that she brews some of the most delicious beer in Europe), for she is essentially the town of a small monarch.

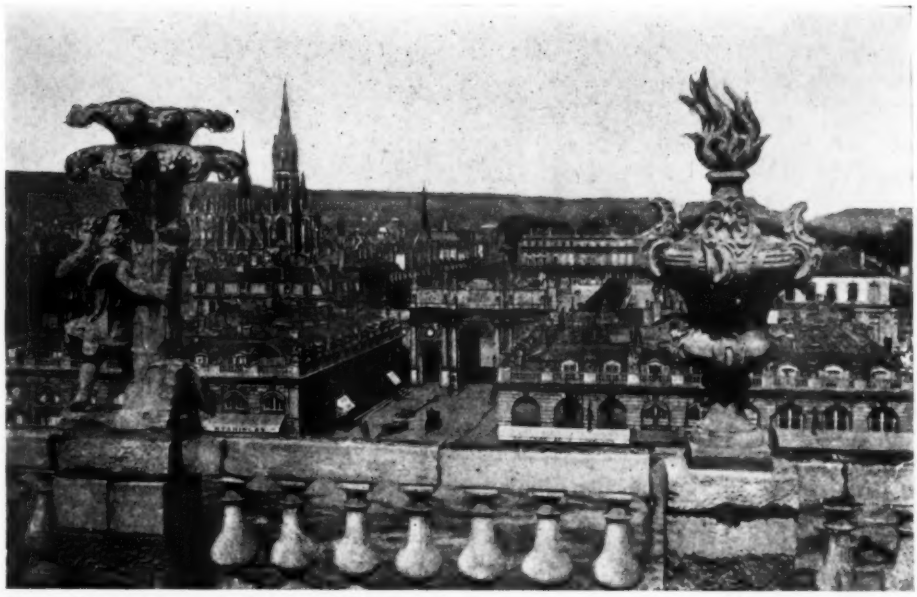
Of the first part of the town, the town of the famous King René, scarcely anything remains today. What little there is lies athwart the Rue Ville-Vieille which threads the old town. Here is the fourteenth century ducal palace, mostly rebuilt after destruction by fire, but the portal is a very beautiful example of sixteenth century Gothic. The surviving wing of the Palace now contains the archæological museum, one of the most beautiful exhibits in which is the tapestry found in the tent of Charles the Bold after the siege of the city. Near by is the Church of the Cordeliers. Here in brief is the history of the Dukes of Lorraine, beginning with a curious eleventh century statue of Gérard d' Alsace, and passing on to the family of the Kings René, René II having a beautiful stone carved polychromatic screen erected over his remains. Leading out of the church is a circular mortuary chapel, added early in the seventeenth century, with a deeply coffered dome and containing the remains, in great



NANCY—LE PALAIS DU GOUVERNMENT AND HÉMICYCLE DE LA CARRIÈRE

black marble sarcophagi, of seven dukes of Lorraine.

The building of the second town was begun by Duke Léopold, who employed J. H. Mansart. His first and only work in Nancy itself was the Cathedral, a straight-forward dignified building, clean cut, but a trifle dull and uninspired. Mansart was followed by Boffrand, who began the Palais du Gouvernment and laid out the beautiful Place de la Carrière which takes its name from the erstwhile tournament ground. But scarcely had the work begun than it suffered a check owing to political disturbances and consequent financial embarrassments. The next architect was Héré, and to him is due most of the present beauty of Nancy. He completed the Place de la Carrière, flanking it with rows of small elegant houses and punctuating the extremities by a pair of taller and slightly projecting buildings. He linked up the Palais du Gouvernement with the top buildings of the Place de la Carrière in a masterly way by means of two curved screens, so that the whole is united by a continuous order. He also embellished the square with balustrades and statues and laid out the intervening space between the houses as a charming public garden with double rows of pleached plane trees, now grown into a cool green cloister. At the southern end of the Place de la Carrière he placed a triumphal arch, the most beautiful of many in the city, built at the command of Stanislas in honor of Louis XV. This arch forms a connecting link between the Carrière and the magnificent Place Stanislas, a wide open space as beautiful as any to be found in Europe. At first it seems that its beauty lies simply in its spaciousness, its elegance, the rhythmic symmetry of its buildings, and in the beautiful wrought-iron work picked out with gilding, of gates, screens, and lamps. A closer examination, however, reveals many subtler contributory causes. Entering the square from the triumphal arch one passes between blocks of low pavillion-like buildings, and sees opposite the long Hôtel de Ville, and on either side a pair of symmetrically placed buildings, housing the Grand Hôtel, the erstwhile bishop's palace (now the new municipal theatre) and the old municipal theatre, and one realizes that an effect of crescendo culminating in the bescrolled clock turret of the Hôtel de Ville has been most skilfully arranged. Had the northern end of the square been closed with equally high build-



NANCY—PANORAMA FROM L'HÔTEL DE VILLE

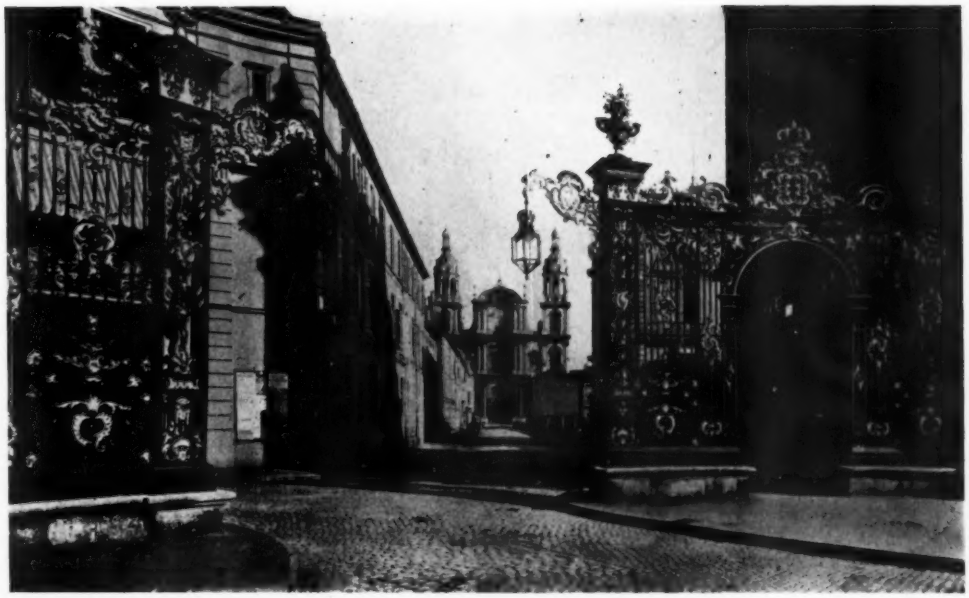
NANCY—L'HÔTEL DE VILLE

NANCY—PLACE STANISLAS

ings, not only would this effect have been lost but the triumphal arch would have lacked the rightful emphasis which its position near the lower buildings gives it. There is great skill too in the arrangement of the beautiful curved iron grilles, the work of Jean Lamour, of Nancy, across the angles of the *place,* thus uniting it all.

The whole of the vast Hôtel de Ville is not devoted to official purposes, and a few of the first floor rooms are given over to a collection of pictures. It is for the most part a typical provincial collection, but here and there is a picture of outstanding interest, such as a Passion by Lucas van Leyden with its crowds of small busy figures and its mass of incident, or *Christ ejecting the money lenders,* by Jean Van-Hemssen, which shows the painter rejoicing in his recently acquired skill in perspective displayed in the foreshortened faces of the sprawling merchants, or *The Abduction of Helen,* by a master of the German school, with its vivid foreground of activity, the grey middle ground of harbored ships, and the blue back ground of sea and hills, the whole ranged round a center temple with strange architectural embellishments. Then there is the large collection of caricatures by Grandville, a native of Nancy, of the early nineteenth century. But apart from these attractions what perhaps makes a visit to the collection particularly worth while is that to reach it one must pass up the very beautiful staircase with its immense unbroken sweep of string carrying an exquisite balustrade of Jean Lamour.

Nancy is a town of open squares. Another of the largest is the Place Carnot, leading from which is the long Cour Léopold, which, like the smaller Place de la Carrière, is lined with trees and carpeted with grass of the brightest green and which with its neat little eighteenth century houses seems in some odd way to be a kind of French version of Kew Green. One of the most beautiful of the smaller squares is the Place d' Alliance also designed by Héré at the command of Stanislas, this time to commemorate the alliance of Louis XV and Maria Thérèse. It, too, has its double row of planes and is surrounded by small houses. But it has about it now an air of exquisite faded elegance: a kind of autumn bloom has fallen upon it as it stands back entirely secluded not far from the opulent Place Stanislas. By far the largest open space in the town



NANCY—THE CATHEDRAL

NANCY—PLACE STANISLAS

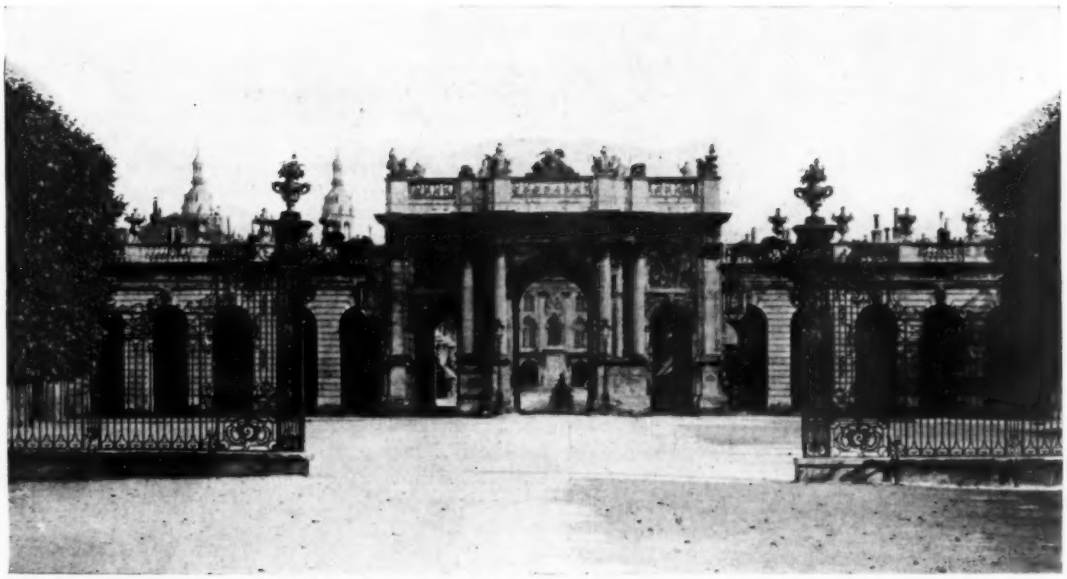
NANCY—PORTE NOTRE DAME DES CHAMPS

is Promenade de la Pépinière, a large garden laid out with a charming formality of paths and ornate geometrical flower beds, and containing an unusually fine collection of trees. The Pépinière, too, forms part of the general scheme of Stanislas.

Of the other churches, those of St. Sébastien and Notre Dame de Bonsecours are interesting. St. Sébastien, the work of Jean Nicolas Jennesson, is situated in the market which surges up to its very portals. It has a curved front with large ornate stone panels between the pilasters. The interior is unsatisfactory for there is a vaulted roof carried on large columns without any entablature. Notre Dame de Bonsecours is an early work of Héré. It is aisleless and this fact impairs the proportions of the west front which appears narrow and restricted. As a central composition, however, it would have been extremely successful. Within the church there is a kind of German voluptuousness about the sedan-chair-like pulpit, the absurd fragments of broken pediments looking like unequally expanded concertinas. And the chancel resembles some eighteenth century stage set for a tableau, with its sheets of metal painted to represent hanging proscenium curtains and its insipid figure of the Virgin flooded with light from an invisible source. Even the confessionals are an orgy of rococo ornament, amusing enough but certainly unsuitable. Bonsecours contains the tombs of Stanislas and his wife Catherine and also the heart of their daughter, Marie, Queen of France. It is still the object of a constant pilgrimage.

An important contributory factor to the delight of Nancy is the number of arches and gateways. We have already referred to the triumphal arch which connects the Place Stanislas with the Place de la Carrière. This is the finest of the eighteenth century arches, of which the others were mostly designed by Mique towards the end of the century, but some of the old gateways are very beautiful. Many of them have been refaced from time to time as the city's fortifications have been strengthened, so that one passes, as it were, through a succession of arches which have been deposited against one another making one deep continuous tunnel. From their position can be traced out the old city boundaries.

The third and final deposit of the town of Nancy lies mostly to the west of the railway and includes here



NANCY—VIEW FROM PLACE DE LA CARRIÈRE TO PLACE STANISLAS

NANCY—PORTE DÉSILLES

NANCY—PORTE DE LA CRAFFE

and there examples of the French *art nouveau* which ill assorts with the eighteenth century urbanity, but, for the most part, it is immeasurably superior to our English town developments of a similar period. A continuous tradition is clearly traceable which, in a country that steadfastly refused to be devastated by the industrial revolution, is not perhaps so surprising.

The visitor to Nancy, however earnest his intentions, must not fail, since gustatory delights do not interfere with architectural appreciation, to taste the light clear beer, with a color and flavor almost as delicate as sherry, and the famous Nancy macaroons. This is best done leisurely in one of the big clean cafes in the Place Stanislas gazing out towards the sedate beauty of the Hôtel de Ville flanked with the gold-picked wrought-iron gates. And if he be fortunate he may see the delights of some provincial wedding, with all its clumsy pomp of ancient landaus and bowing groomsmen, arrive at the *mairie* for the civil marriage ceremony.

H. J. BIRNSTINGL.

EDITOR'S NOTE: This is the third article in the series of Planned Cities. The first of these—Bath, England, by Robert Atkinson—appeared in the JOURNAL for March, 1923. The second—Edinburgh, by Thomas Adams—appeared in the JOURNAL for January, 1924. Additional articles are in preparation and will appear at intervals in the near future. The first of these will probably deal with Bordeaux.

From Foreign Shores

Again as to Environment

EIGHT weeks ago this very day I sat in this same bay window arranging and labeling (I hope not libeling) my offerings from foreign parts. But how different is the external aspect! The warm spring zephyrs are not stirring the filmy curtains and the windows are closed against a cold rain, which, although now more gentle, swept violently down from the north and east all through the night. The church goers are not in evidence upon the drenched sidewalks—they may be in the numerous auto-cars and taxicabs which pound by incessantly leaving wakes of splash and spray upon the surface of the pavement, and storming with sad, monotonous, pulsing noises the air above. Yet even as I write a mellow glow suffuses the dripping atmosphere and the sun promises to break through and assert its wholesome authority in behalf of spiritual cheer and physical comfort. So that, after all, should aught of pleasantness tint my words I may not be able to attribute the quality absolutely to my own genial personality and equable temperament; although should the chill and drear atmospheric condition hold I shall give it the credit, or discredit, for whatever of severity or of a carping nature characterizes my thought.

The Changing World

There is, in that section of the British architectural press which comes to my table, sufficient to give one pause to cogitate upon changing times involving, as they most surely do, a changing, or already changed, attitude of the organized architectural profession toward architecture as a profession and as an art—and these as affected by organization. The ever-changing times! The yielding and impotent say (though in the face of circumstances we all are more or less impotent) "My times are in Thy hand"; but there are brave hearts who do not yield gracefully, who do not accept the decrees of Providence, or of Fate, or of whatever you will, as other than man's decrees and who go down, if they, indeed, do go down, still Captains of their Soul, still Masters of their Fate.

Now, I am not giving any final dictum on all or on any one of the points at issue; but experience and conditions have forced me to think much upon the matters involved in the recent joint action of the Council of the Royal Institute of British Architects and of the Society of Architects, as reported in the British architectural press—notably in the *Architects' Journal*, of London, in many of its recent weekly issues. Up, out of the mass, project two peaks on which we may focus our attention: Regis-

SOUTHPORT WAR MEMORIAL *From the "Architects' Journal"*

GRAYSON AND BARNISH, FF.R.I.B.A., AND A. L. MCMILLAN, A.R.I.B.A., *Joint Architects*
H. TYSON SMITH, *Sculptor*

tration and Institutes. Up behind and beyond both of these looms a loftier peak—the Art of architecture; so remote it is however, and diaphanous, that the fleshly eye, fixed on the lesser peaks, discerns, seemingly, neither it nor its portent. All these peaks are to be viewed from a base called Education, and the Art peak from a base called Culture. This latter base is almost as remote and diaphanous as is the peak itself; consequently Institutes and organizations generally do not utilize it. In the process of evolution Art arose above the mists first; Institutes next and Registration last of all—so in contemplating them we shall view Registration first as the newest and least important factor.

Registration—Why?

In favor of a registration of architects only two reasons can be advanced. First, protection of the public; which is valid—only it can be better accomplished in another way if the public really wishes to be protected (from itself); and second, protection of the profession (and its corollary, the inevitable restriction of all practice to the members of a legally self-limited profession) which is invalid; and especially so if architecture involves an art and is not purely a trade.

As to number one: The public can protect itself individually by employing only such men as have a recognized ethical and professional standing, as, say, a Fellow or an Associate of the R. I. B. A., or, perhaps, a member in good standing in any one of the Allied Societies or in the Society of Architects. This under existing laws and conditions. If the public is too indolent or indifferent to ascertain the facts as to the architect it proposes to employ it can be protected against itself by a law which provides that no structure shall be erected from any plans which do not conform to a building code setting forth minimum requirements as to structure, safety, and sanitation. Such a law could easily be enforced and administered in so compact a community as is Great Britain. (Such a law ought to be in force throughout the entire United States.) I am not discussing details now; I am discussing principles. Here is where the gleam from the iridescent peak of Art illumines the path. Art—Beauty—and the power to produce it cannot be taught in schools nor imparted by instruction. It is a gift from the Gods to be developed by the individual in the exercise of his powers. Those powers do not reside in everyone who passes the School or Institute examinations in structure and design. But the public should be given the right and the opportunity to profit from the exercise of such powers wherever they may be found to exist. From whatever source the plan may come—Tom, Dick, Harry; plumber, blacksmith, amateur; or even architect—a per-

PARLIAMENT BUILDING, OTTAWA—SOUTH ELEVATION *From "The Journal, R. A. I. of Canada"*

JOHN A. PEARSON (DARLING & PEARSON), *Architect.* J. O. MARCHAND, *Associate.*

mit should be issued to a conforming plan which could be materialized into a beautiful, safe, and economical building; and so the public would be protected while art and advancement would not be stifled.

As to number two: If the profession of architecture is so vital to society it can well protect itself by showing itself sane and broad and generous in all its dealings with society and with its own membership. If the appellation "Architect" is sacred, it is not so in itself, but because architects as a profession and individually, and mostly the latter, have rendered distinct service to society; and the profession can be sufficiently protected, as a profession and individually, by inducing society to permit only such individuals as may have qualified in a prescribed manner to prefix the term "Registered" or "Chartered" or "Licensed" to the general title Architect.

And now as to the second peak—Institutes.

What Is an Institute—And Why

Architecture, probably produced by architects—as it was architecture—has existed throughout the ages the greatest expression of the culture and civilization of the time, and this without the external assistance of technical schools, institutes, or legal stimulants. In fairly modern times its practice seemed to fall in evil ways; therefore certain altruistic members of the "profession" banded together, not for political purposes, nor to control legislation, nor to direct education along certain hard and fast technical lines, but to raise a standard of practice, to establish fellowship and each to aid the other in holding high the torch of progress. Those deemed worthy of such fellowship were called Fellows when later they established the Institute. Those who had not yet reached the high estate, but bade fair to, were admitted as Associates —Associates of the Institute which was composed of the Fellows whose real purpose was to elevate a standard which all who wished might follow; not necessarily as Fellows or Associates of an Institute, but as members of a profession. This was done not to raise a profession, but to enhance the value of the service the individual could render to society in his professional capacity.

And now to be explicit. During all the years of its existence up to within a few months the R. I. B. A. has been content to be a leader—and it has been the standard bearer—the leader of the profession at home and abroad and in a most enviable position. Forty years ago a small coterie of the Institute thirsting for power, shall I say? for such limitation of the profession as might be accomplished through state registration, being unable to move the Institute, broke away and formed the Society of Architects and became quite a force in the architectural life of the community. But they could not put over a National Registration Bill while the Institute itself was lukewarm or opposed. There must be *Unity* among the profession in the matter before Parliament would consider the project. There were those within the Institute who felt that they were losing prestige while members of other societies, including the Society of Architects, were gaining; that the public was beginning to be unable to distinguish between the two principal societies or was divided in its allegiance. Thus the matter of Registration came before the Institute again and there arose within

the Institute a body sufficiently large to elect a council committed to the proposition. But Parliament would not listen to two bodies even though they wanted the same thing, and that thing was ostensibly the "Protection of the Public!" Parliament wanted *Unity* in the profession. And so we have the situation as it is before us today. The Institute has relinquished the ideal of leadership in behalf of that of Power and Domination. Here is the first clause in the R. I. B. A. Council's statement:

(1) As a Council we declined, in the interests of the R. I. B. A., to consider a registration policy which does not leave the R. I. B. A. *supreme as the registration authority*. (The italics are mine—I. K. P.)

Will a Parliament step aside, relinquish its prerogatives, and turn the public over to the tender mercies of a professional body, no matter how altruistic may have been

From "The Journal, R. A. I. of Canada"

PARLIAMENT BUILDINGS, OTTAWA—CONFEDERATION HALL
JOHN A. PEARSON (DARLING & PEARSON), *Architect*
J. O. MARCHAND, *Associate*

the acts and ideals of that body in the past? That is for Parliament to answer, not for me. But I know what my answer would be; and the reader can guess from what I have said above as regards registration.

The Society wants a hand in the pie—the exercise of power—and is willing to be swallowed up (or its Council is) to procure it; for clause 11 says:

The Council of the Society of Architects could not see their way to support an R. I. B. A. Bill on these terms, but offered to consider the dissolution of their Society and the absorption of their members by the R. I. B. A. as an alternative.

The Council of the R. I. B. A. wishes to be returned

From "Deutsche Bauhütte"

PART OF A HOUSING GROUP IN HAMM, WESTPHALIA
ALFRED FISCHER, *Architect*

to office on this platform and as the election occurs some time in June it may or may not have been returned before this is in print. I therefore feel free to express myself although the members of the organizations involved were asked not to criticize the scheme or raise embarrassing questions!

A Newcomer

Number one, of volume one, of the *Journal, Royal Architectural Institute of Canada,* is on the table before me. It is a quarterly, attractive in form and make-up. It looks quite homey, having, as it does, a "Secretary's Page," a "Structural Service Department," and news from the chapters called "Reports on Activities of Provincial Associations." In this issue are reproduced photographs and drawings of the New Parliament House in Ottawa, of which John A. Pearson, of Darling & Pearson, is the Architect, with J. O. Marchand, Associate. There is presented also a good portrait of Frank Darling, LL.D., R.A.I.C., R.C.A., F.R.I.B.A., Gold Medalist, R.I.B.A., 1915, who died on 19 May of last year.

Construction, of Toronto, Canada, gives a still more elaborate presentation of the Parliament Buildings in its May issue, which is a very attractive number. In the April issue is an article, interestingly illustrated, on the

From "Deutsche Bauhütte"

PART OF A HOUSING GROUP IN HAMM, WESTPHALIA
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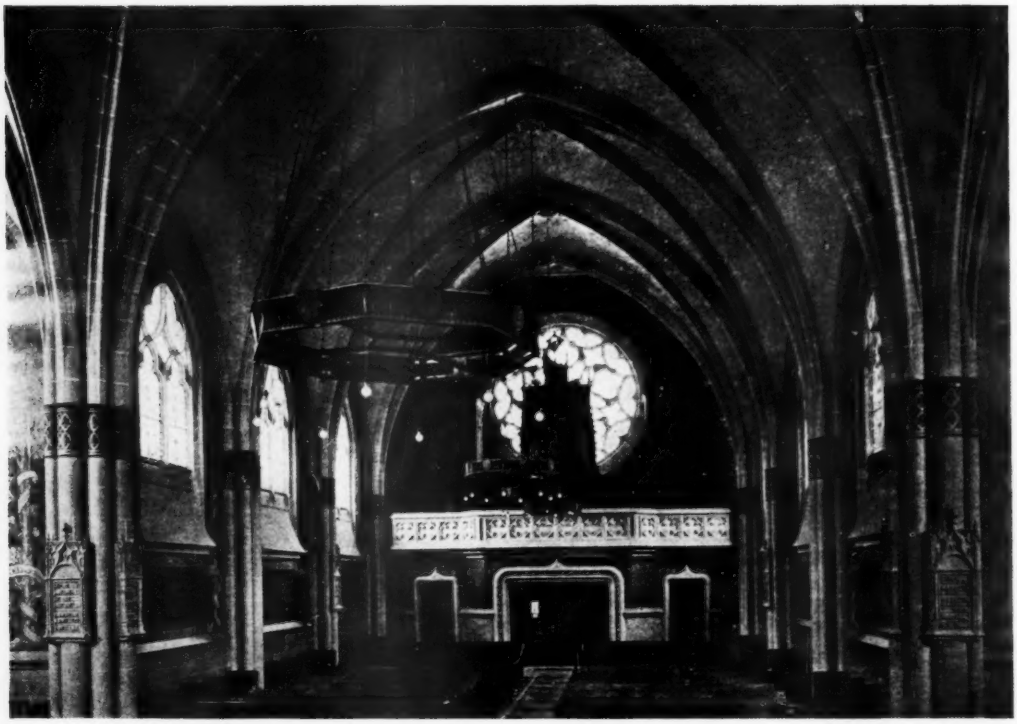


PROTESTANT CHURCH OF RHEIMS — *From "L'Architecture"*

CH. LETROSNE, *Architect*

rehabilitation of certain slum districts in Philadelphia. The illustrations show the patient before and after taking. The *Journals of the R. I. B. A.* are, as usual, replete with interesting literary material.

There is fairly little in the way of illustrations in these present offerings to attract comment. There is little that is either good enough or bad enough to warrant the critic in holding up the one for emulation or presenting the other as a horrible example. Some of the German periodicals, as for instance, *Deutsche Bauhütte* of Hanover, illustrate some well planned and designed working men's homes in connection with an industrial town, a well considered plan of which is also presented. We reproduce two or three illustrations.

Architekten, Copenhagen, illustrates in the 30 April issue, Broadway, New York, at night. Underneath are some lines which I do not understand; but I know that had I written them I would have said things not very complimentary to American taste.

Architecture, London, for May, contains much good reading matter, in which is an article A. by Trystan Edwards on Public Criticism of Architecture, and a series of Book Reviews by Lionel B. Budden, Institute gold medal essayist of a year ago. The editorial in the April number of this same Journal makes one wonder at the provincialism of Londoners, assuming, of course, that the writer knew nothing of the use of the lift, we call it elevator, in creating and maintaining values in upper stories; that is, knew nothing of the subject until "Bush House" was built and furnished as an example. Bush House, Aldwych, is nine stories in height and all about it are existing nine-story buildings by English architects. Do they make the Britishers walk to the top as in the Paris apartments for the middle class which I have commented upon in these columns? The British writers are bound to make this particular "Bush House" one or all of the seven wonders of the world—although Mr. Edwards, in the article referred to, expresses a fear that the completed building will knock St. Paul's off the map. (My words—his sentiment.)

As for public criticism of architecture—or private either for that matter—it is impossible; that is: true valid criticism is impossible today because of a lack of standards; because of a non-appreciation of principles; of a non-comprehension of fundamentals. We liken buildings to the body and speak of clothing the skeleton. Now the difference between the building and the body is that in animals the skeleton cannot stand without the functioning muscles and ligaments of the body; and in the building, the clothing or cloaking material cannot stand without the firm, braced skeleton. The skeleton structure is not called upon to show through in a building any more than it is in a body. But there is no logic, and certainly there can be no beauty, in dressing up a horse's skeleton in a man's or a lion's muscular cloak and calling it a man or a lion, as we do when we dress up the plan and structure

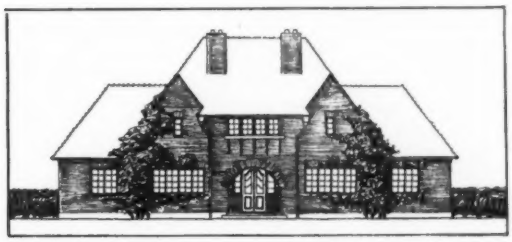
FROM FOREIGN SHORES

From "L'Architecture"

PROTESTANT CHURCH OF RHEIMS—ELEVATION
CH. LETROSNE, *Architect*

of a bank in the forms of a Greek temple and call it a bank. It is not a bank—or what a bank should be; it is a vulgarized Greek temple. And anything vulgarized is bad art. We must have understanding of fundamentals before we can criticize art; and the art is all there is about buildings for us to criticize.

A paragraph from Charles Marriott's reflections upon modern English architecture is quoted with approval by the Editor of the *Architects' Journal,* London, of 9 April, as to commercial architecture: "Speaking generally, the shops which serve some single, confessed, and definite human need, butcher's, baker's, and green-grocer's, are better than the department stores and big drapery



A GERMAN FARMHOUSE *From "Deutsche Bauhütte"*

establishments which trade upon human credulity and exploit the desires rather than the needs of silly women." I rather enjoyed that paragraph myself—and then I began to wonder, as touching art, just where need left off and desire began; just where that vague line of demarcation was to be drawn between need and desire in the fields of art—of literature—of religion! We shall have to get down to fundamentals before we can speak with certainty in these matters. Next time I want to speak more fully of this affair of art as well, perhaps, as of economic matters touching upon such things as Architects' and Surveyors' Assistants' Professional Unions and their direct representations on the Council of the R. I. B. A. The R. I. B. A. can force this by becoming a closed shop itself; and it can become a closed shop by adopting a certain attitude toward registration.

IRVING K. POND.

Speaking of Precedent

SPEAKING of Precedent versus Originality, a subject most ably treated in our last Annual Convention, it perhaps seems absurd to add one jot or one tittle to what was said, but was the subject ended with that discussion? Will it ever be ended?

We heard five remarkable papers on the subject. It is curious to remark that the only one supporting precedent was Mr. Cram's.

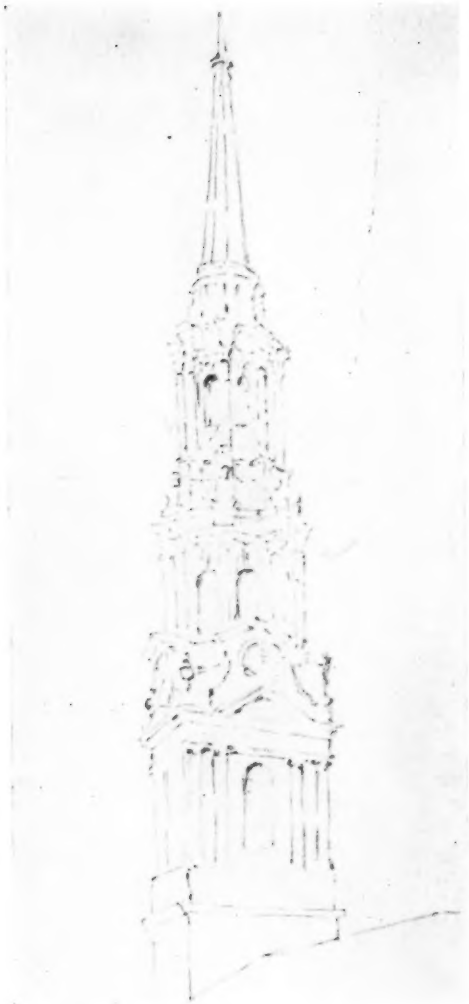
Now just what is originality; just what do we mean by originality? Taken in its extreme sense, originality means freedom from influence, especially influence of other men's ideas. A pure product of self and self-interpretation, a child of an individual brain. I say this is the extreme end or minus infinity of our subject as opposed to a pure copy, if such could be made, placed at a plus infinity. Between these two extremes lies the entire course of architectural design.

Let us see what minus infinity means in its fullest sense. It must mean any object created free from the influence of any outside force other than the objective itself, under the creative influence only of the creator's brain.

How can such a minus infinity be imagined? Let us say we take a child born of artistic and cultured parents, put it in the care of the most ignorant of guardians, bring it up, we will say, to an age of self realization, in a flat prairie plane, in a tent, and never allow it to see anything in form of human make. At the end of this period give it a pencil and paper and tell it to design a cathedral, even to a written description of the space on the ground a seat must occupy, and a description of its chancel requirements, in words only. Of course it must know some means of measuring. What would be the result? Absolute originality, but I am sure, in fact certain, the result would not fulfill our ideas of at least a proper solution of the problem.

Now let us take our plus infinity. What is a copy? A copy in its fullest extent is an exact reproduction, a Ford machine made to gauges, a 16-in. shell made with the minutest micrometers under the full supervision of the

ST. MARTIN'S IN THE FIELDS, LONDON



ST. PAUL'S, NEW YORK CITY

FIGURE 1

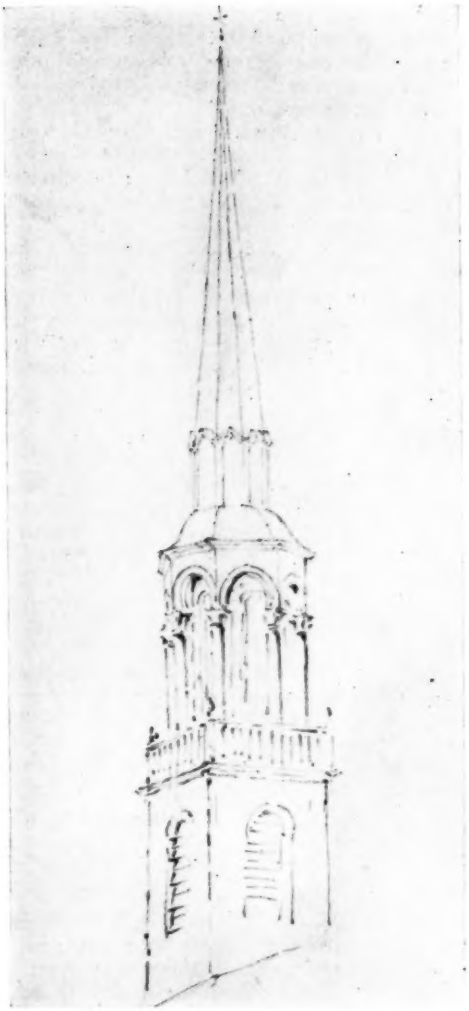
Bureau of Standards. But is this possible of a building? I think we will all agree that it is not. Then what stands for our zero or middle path? Surely it is this middle path that American Architecture must follow.

Again, let us take an example or parallel to Mr. Magonigle's idea of originality. We look into a mirror and recognize our face. We say, "I am John Smith," or "Tom Jones," "but is my face original? Is not my face composed of two eyes, a nose and a mouth at the bottom, flanked on either side by projecting ears, and roofed with hair?" Study it closer. You say, "I have the eyes of my father, the hair of my mother," and you hear the remark, "Doesn't he look at times like his Aunt Jane?" Yet my face is essentially masculine and we would resent any statement that said we were not ourselves.

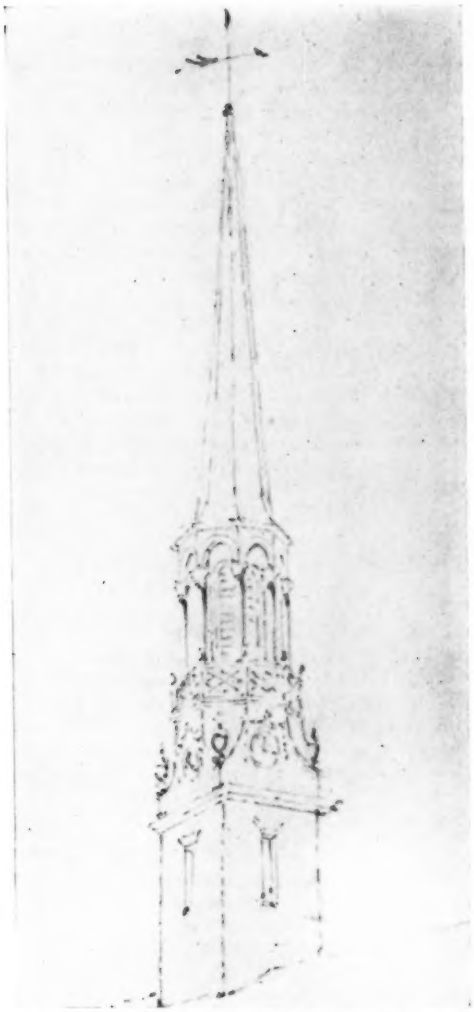
But our Creator did not use the originality at his command. Suppose we decided to change the nose to a corble in the center of our foreheads on which to support our hats, and the ears likewise so designed. Using a little more originality in the design, we would place an eye on the four sides of the head because the eye can take in only ninety degrees, and again in order to eat soup more readily, the natural place for the mouth would be at the top of the head, with a sound reflector to broadcast our voice. The rest of the face or head quite naturally follows with a graceful volute into our necks, and we have immediately produced an original design.

More than likely our arms are not perfect. Four would be better than two, and wheels on the soles of our feet would add to our means of locomotion.

We could change the design to agree with the many



OLD SOUTH CHURCH, BOSTON "A"



FIRST PRESBYTERIAN CHURCH, FAYETTEVILLE, N. C. "B"

FIGURE 2

styles by simple application of the details, and a change of line. Rhythm would no doubt play a great part.

"What nonsense!" someone says. Yes. I agree with you. *I* am the product of generations. *I* go back perhaps millions of years. *I* have been produced through countless ages of evolution. Under the guidance of our Almighty Creator, the Great Sculptor, *I* have been a handful of clay moulded, pressed, urged this way and that by a Loving Hand, always present, always near. Each generation has under Almighty Guidance and Care added to my personality, my powers to think, act, do, until today *I* am *I*, and *I* shall proceed through countless ages to improve, grow greater, more complex, higher in type, until my Creator in his infinite wisdom says "stop," and there will be an end to all that we now know and recognize. Am *I* original? I think not. Am *I* a copy? I think not. *I* am *I* by the grace of God.

In the Minutes of the Institute about 1868 there appears the statement that St. Paul's is a copy of St. Martin's in the Fields, and that the New York City Hall is a copy of the Capitol at Rome. Look at the illustration closely. Are they copies? Similar, I admit, but are they copies? This is Figure 1.

The writer just finished a church which is reproduced in Figure No. 2. "A" is the Old South Church in Boston. "B" had its inception in "A" with changes dictated by personal taste and a desire to meet existing conditions. Are they alike?

Given a different locality, different exposure, different climate, different materials, different workmen, is it pos-

sible to make a really true copy? Seldom can it be done.

Then what should be our course?

First we should study mass proportion, scale, relations of mass to voids, and so on. Then we should study all styles, first superficially, learning how other generations have solved their problem, irrespective of style as a decorative feature. Then we should study style, all styles, intimately, in detail, as we would learn our words in language, and learn to apply them intelligently.

Here we are, a free country, with no architectural precedent of our own. We should draw freely from the great wells of Architecture of the past.

We will then go forward, creating out of a mass of infinite resources a new style of Architecture, truly American, truly of our century, but it must be borne in mind that if we are to produce a French essay we must use the French words, and if we are to produce a Christian edifice we must use the Christian motives, holding closely to precedent lest our composition speak a polyglot language and our meaning fail to be grasped by our audience.

In our discussion of adaptation, I think no architect should be discouraged. Study of former times, study of architectural styles, history, literature, poetry, painting, sculpture and drama, all contribute to the breadth of an architect's vision.

What makes a building interesting? You will be told it is the correct use of mass, proportion, scale, balance, and so on. Is it not possible that we unconsciously inherit from former generations the gift of appreciation of the beautiful, and consciously or unconsciously grope back in the contemplation of a new building for the history and historic sources or ancestors that shine through its beauty? Do we not see through the eyes of our forebears, the stretching back of history and ancestry? I am convinced that we long for a reflection of that which typified our homes centuries ago, not alone because we individually admire them, but because there has been born in us an unconscious recollection of the homes in which *we* dwelt in the preceding centuries.

Surely mass, proportion, scale, balance, exposure, climate, color, grades, selection or adoption of style, and the many other requirements which are the dictates of any problem, will give us all the necessary freedom to exercise our ingenuity and originality.

Still another point. There is one point at which American Architecture falls down. Most of us are trained to think first of the plan and then of the elevation. We are not trained to think in three dimensions at once. There is no doubt that the great architects of the Gothic period did think in three dimensions simultaneously. The very fact that a design for such great cathedrals as Amiens started at the top and worked down instead of the usual way of working up is to my mind one of the causes of superiority of their designing, and taught them to think along broader lines than we do today.

Still, there is seen here and there an awakening, a spark, which foretells of an American Architecture. When our cities look upon their development logically, when they realize their streets are limited in capacity, that the owner of each lot is entitled to light and air, when real estate owners awake to the realization that building on the maximum area of a lot is not the economical use of land or buildings, when architects become so unselfish as to take into account the neighbors when they design new structures, there will be sufficient requirements laid down and in fact greater freedom of mass and form, out of which will spring an Architecture greater than we have yet realized, or has ever been realized.

HOBART UPJOHN.

Paris Letter

THE increased cost of material and of labor, in France as everywhere, as we have already said, has perceptibly slackened the rate of construction activities. Among buildings intended for business and industry no crisis has come to pass. For financial reasons, many companies have enlarged their business premises, the expenditures thus effected reducing the amount of income eaten up by taxation and at the same time giving them much better production and office facilities.

In buildings intended for human habitation, a reactionary movement may be discerned, in two clearly distinct phases: on one hand the large houses or groups of houses containing from 20 to 100 apartments and sold by apartments; on the other hand, fine one-family houses, and private mansions. In general, the latter are being built in Paris itself, and are designed by architects. As for the one-family houses, for the most part constructed in the suburbs of Paris (up to ten or a dozen kilomêtres from the city) many are being erected by speculators, in very cheap fashion, and despite that, with a labored refinement in their decoration (at least upon the street façade) which evidences with a remarkable clarity the deficiencies—in taste and æsthetic education—of their builders and owners. Our greatest hope is that nothing will remain of these excrescences in fifty years' time.

Aside from this private work, the municipalities have made great efforts to assure the building interests sufficient activity to employ available men and material. We have already related the story of the low-rent housing program of the City of Paris. The construction of new schools is being carried on without interruption, and among the older schools which can be altered, electricity and central heating are little by little being installed.

Concurrent with these operations, another program of public shower-baths and swimming pools has been elaborated and put in hand. But even before these "little oceans" have been filled with water, terrible tempests have stirred them, and the architects of these edifices have had to exert true courage in supporting these outbursts in silence.

The story is well worth telling: for it will interest our American confrères and I can well imagine that public mentality is very nearly the same everywhere. But in order to understand properly the acuteness of these incidents, the American reader must first fix firmly in mind the thought that in France many people who have passed

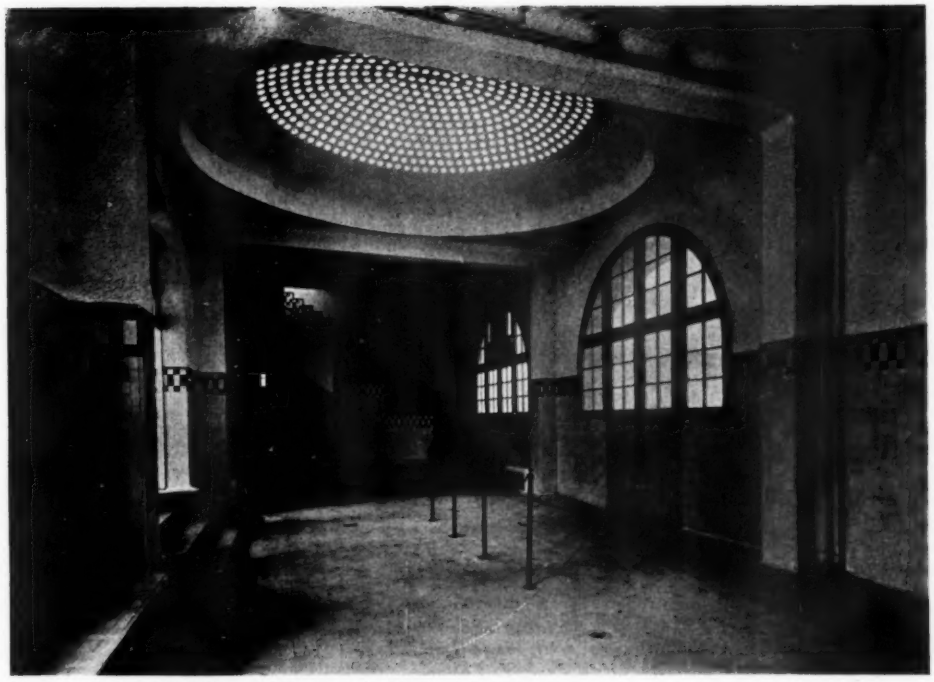


FIGURE 1—ENTRANCE HALL, MUNICIPAL SWIMMING POOL, PARIS

forty look upon a swimming pool as an establishment *de luxe*. But others, and especially all the younger generation which unhesitatingly makes its wants known to the municipalities, demand these pools as a necessity. So the Administration of the Prefecture de la Seine, acting in accord with the Conseil Municipal of Paris, has worked out a comprehensive program for the erection of bathing establishments in various quarters of the city, to relieve the load upon three or four municipal pools already obsolescent; and in addition for the construction of a Nautical Stadium intended for the swimming races of the Eighth Olympic Games. It is this latter edifice which has given rise to violent incidents, and the ink already spilled in discussing the proposal might easily have filled its capacious basin to the brim!

So that all would be ready in good time, plans and estimates were required from the architect in an extraordinarily short time, the execution of the work was ordered without delay, and today the Stadium is all but complete: such rapidity deserves only praise. But the press—*la grande Presse!*—informed the public one fine day that the Stadium was going to cost several millions of francs above what had been originally estimated.

So many millions, thought the public, simply for sinking a hole in the ground! for so the vulgar imagination thinks a pool is constructed. It was added that the excess in expenses was due to the shortsightedness of the architect, who moreover (it was hinted) had an interest in increasing costs in order to swell his fees. I fear me this state of mind concerning the honorariums received by architects obtains in all countries. It is the most unhappy insinuation which can be made against us. All architects worthy of the name, from the very day they choose their career, have renounced the usual gains of business in order to act in a truly professional capacity and in recompense they receive the gravest injuries.

These insinuations came to the ears of the Conseil Municipal of Paris, and there, in a confused discussion, the Prefect of the Seine, the Government's representative, insufficiently informed, was not able to defend his architect's services with all the efficacy desirable, and was forced to agree that the architect be brought before a disciplinary council (composed of functionaries elected by their peers) to look into the matter. I hasten to state that M. Bévière—for that is the name of our very distinguished confrère—has received notification that the council has already decided that there was no ground for action against him. We are convinced that our confrère will receive a more glowing compensation on the day the Nautical Stadium is opened.

But today architects have evinced great satisfaction in attending the inauguration of the first new bathing establishment, the work of M. Louis Bonnier, an architect and city planner known throughout the world, whose talent has not ceased to increase with time and who, now past his sixtieth birthday, seems to belong, by his art, to enthusiastic youth, in all new things.

The general plan of this establishment is extremely simple. A large vestibule (Fig. 1); to the left, a space reserved for those who merely require showerbaths; at the right, dressing rooms for swimmers (Fig. 5), which includes 300 lockers. In the center, the swimming pool

FIGURE 2 —THE BASIN, MUNICIPAL SWIMMING POOL, PARIS

FIGURE 3—BASEMENT, MUNICIPAL SWIMMING POOL, PARIS

FIGURE 4—BASEMENT, MUNICIPAL SWIMMING POOL, PARIS

FIGURE 5—DRESSING ROOMS FOR BATHERS, MUNICIPAL SWIMMING POOL, PARIS

itself—a covered pool, for it must be used the year round for bathing at a comfortable temperature.

To pass from the dressing rooms to the swimming pool, the bathers must traverse a shower room where they are required to wash themselves before entering the pool. The basin is built along the lines of the latest improvements. It is a completely isolated member—one can circle it beneath and around the sides to verify this. Figs. 3 and 4 show the arrangement of the basement. The separation of the pool from the rest of the structure is complete, and even the platform on which the swimmers walk about the pool does not touch the basin, which is thus free to contract and expand without regard to any other factor. The hall, built entirely of reinforced cement, is of happy proportions. Fig. 2 illustrates it better than I can describe it.

Thanks to this construction there will be no dripping from the condensation occurring on the painted surfaces. Moreover, above the platform, stands a false roof likewise built of reinforced cement, and providing complete ventilation, as shown in Figure 2.

At about the height of the average man, throughout the establishment, the walls are covered with white faience, with borders of blue, green or brown—and their arrangement has been studied with the greatest care to obtain a good effect with a minimum of expense. The hot air, in most of the rooms, enters at the sides of the benches, all of which are of cement.

There is an interesting fact about the water—which rises from an artesian well sunk at the same spot as the establishment. This water, taken from a great depth, reaches the surface of the ground at a temperature almost right for the baths. Its flow is sufficient to renew the water in the basin completely every ten hours. The necessary additional heat is imparted by steam-heaters, capable of heating the entire supply of water in case the flow from the well is interrupted. The bottom of the pool is paved in dark blue, with three white lines laid its entire length, as guides to swimmers in races which may some day be held here. The pool is 33.33 metres in length, which enables the swimmer to cover 100 metres with but two turns. Its depth runs from .75 metre at one end to 2.75 metres at the other, but the water-level can be raised for races another .25 metre. An amusing idea has been executed in this pool: portholes containing electric lights have been placed at intervals along the bottom of the pool, following the white lines mentioned before, for gatherings in the evening. By daylight the water, through which one can see the blue and white bottom, takes on tints which recall those of the Mediterranean along the Côte d'Azur. But the usual run of the clientele of this establishment will scarce enjoy the opportunity of comparing this illusion with the reality, for the quarter in which it is erected is one of the poorest of all Paris. These baths are not free; a franc and a half is the usual entry fee. However, one day a week, the admission is doubled, and so great is the lack of similar establishments in Paris that many well-to-do people come on this special day. It is hoped by this means to defray a part of the not inconsiderable costs of construction and amortisation. The building complete represents an outlay of some 4½ million francs. But such expenditures are not to be regretted for such a purpose.

To reply to opponents who cry out at such prodigality when this swimming pool is mentioned, I have adopted a set reply: "One swimming-pool saves a hospital." I have at hand no statistics which would honestly allow me to be more assertive than that, but generally my antagonist goes away satisfied, and at the first opportunity repeats the phrase to someone else. When it has made its way throughout France—possibly then I will no longer be here—all our countrymen will then admit that the swimming pool is a necessity, and not a sumptuous architectural luxury.

G. F. Sebille.

The Secretary's Page

33. The 57th Convention is a matter of history. Yet, although many things have been written about it the Secretary cannot refrain from mentioning two or three little things which appealed very strongly to him. Firstly, the luncheon at which there was a Secretaries' Table. A paper was passed about on which the different secretaries present wrote their names. When we counted the names afterwards there were just thirty. Pretty good, says the Secretary. The big regret was that the noise and confusion of the room was such that no discussion could be carried on.

34. Then the luncheon whereat the delegates divided themselves up by regions and sat about together. One Regional Director stole a march on the others and had a short, well-attended and enthusiastic meeting just before the luncheon, and held it at the Octagon, the home of the Institute, where they laid out their plans for the year to come and settled on the place for the next real Regional Conference. While they were prompt, the Sixth Region beat them to it for they had already made their arrangements for a Fall meeting. Due announcements of place and location will come later from the proper parties.

The Secretary hopes that both of these incidents of the Convention will develop into regular parts of the program. These were conceived in haste and put over as best they could, but with proper time to allow for them much may be done. Look out for 1925.

35. The Bureau of Standards. It ought to be a name to conjure with. What a delightful visit, perforce all too short, and what a fitting close to a memorable Convention! But the visit opened the eyes of the Secretary to the fact that almost nothing is known about this Bureau of Standards. Like the vast rank and file of the people of the United States, a large proportion of the profession is evidently quite unaware of what the Bureau of Standards is and what it is doing. Many asked the Secretary the question, "What is this Bureau of Standards and what does it do?" He could only answer "Go on in and see." And then the Secretary put on Hans Andersen's "Fortune's Overshoes" and wished himself into the thoughts of one of those several who did not know of the Bureau of Standards. Instantly there he was, and this is what he saw, to his unbounded amazement and delight. Into a room or two in one building, then out to another, then down hill to a third, then about the place to various small buildings and contrivances, into other large buildings, big rooms, little rooms, machinery of all sorts, always passing by interesting looking places one couldn't stop to investigate, and at certain places polite well-informed gentlemen who in a few words gave you a vision of what was being accomplished in that small place.

The Balance Room. A balance that will weigh to one part in a hundred million—we weren't allowed to see the one that weighs to one part in a billion—arranged so it can be operated from across the room so the heat from the body won't cause an error, and where a difference of a few inches in height can be detected in the weight. And we were told that all the standards of the States are checked here with the National standards and these in turn checked internationally at the International Bureau of Weights and Measures near Paris. Hardly dared to breathe.

Elevator Interlock Tester. A machine working away all by itself giving elevator interlocks a life test. It opens and shuts the door and starts and stops the car. It tries to open the door when the car isn't there, and tries to start the car with the door open. And then it records accurately all failures of the mechanism. Think of it!

Hinge Tester. And right across the room a little door on hinges, the hinges loaded as they would be in actual use, and a motor opening and shutting the door and counting the number of times it does so. And this little machine showed that some types of hinges would outlast others, such as are in ordinary use, well, 40 times as long. What is a year's guaranty?

Sound Chamber. Here they have manufactured a "scientific noise," and with it are measuring sound transmission through panels of different types of building materials. If I had only known that before!

Stucco Tests. Here the durability of stucco and the effects of the different variables in stucco making are being tested by building panels on a special building. Panels are left in place for several years, then examined and removed. Expert workmanship seems to be of greater importance than most features of the specifications. I have always felt that to be so.

Wind Tunnel. Three wind tunnels, the largest 10 feet in diameter, and able to produce a wind of 75 miles an hour velocity. This is out-of-doors. Planning to test wind resistance of buildings, and have tested roof ventilators; it is invaluable in all aircraft designing. What next?

Fire Test House. A nice little house which they fill up with condemned furniture and papers and give a life-size imitation of a real fire under different occu-

THE BUREAU OF STANDARDS, WASHINGTON, D. C., FROM THE AIR

pancies. They can observe the progress of the fire and get exact records of the temperatures. Bill will be sore because he missed all this.

AN INFERNO FOR SAFES. Another little test house just north of the other. This has a real furnace which will heat a safe red hot and keep it there as long as wanted. Then they throw the safe down three stories into a ravine behind and see what happens. I rather think this will prove whether a safe will preserve its contents in legible condition when a wooden floor is burned from under it and it drops into a basement. What?

CEMENT TESTING LABORATORY. Here they test all kinds of cement, concrete and stone, and can also test the manufacturing process. The Bureau of Standards tests all the cement bought by the government, and has branch laboratories for this purpose all over the country. Glad I'm an architect.

PANEL FURNACE. Here are panels of actual walls, big ones, so set up that a steady fire of any desired temperature can be maintained against one side of the wall and the true fire resistance of the wall accurately measured. In all these fire tests they use thermo-couples which give the actual temperatures at different depths within the walls. I expect the fire insurance people are watching this work.

OPTICAL GLASS. And here we find them making optical glass, and it is beautiful material too, as fine as any made in the world, and from materials found in the United States. Up to 1914, when the War began, the art of making optical glass was unknown in this country. This optical glass is made in machine-cast clay pots which hold about 1,000 pounds each. Some pots! They cook it for about a day, stirring constantly, at a temperature of 1500° centigrade, then cool it down and break the pot and there remains the solid lump of glass, just like a piece of the most perfect ice you ever saw—into lumps the size of the lenses or prisms to be made, inspected, moulded, ground and polished. What don't they do at the Bureau?

TESTING MACHINES. And then we entered an enormous room with big machines in it, wonderful threaded screws of colossal size, motors, glorified jacks. One of these is vertical and can exert a crushing capacity of 10,000,000 pounds; another with a capacity of 600,000 pounds, equipped to exert bending force or to test very long light structures, such as air ship girders; and a long horizontal machine capable of exerting a compressive force of 2,300,000 pounds (greater than the weight of the Twentieth Century Limited) and a tensile force of half as much. With these machines they can test the strength of all kinds of masonry construction, columns, girders, almost anything which can be constructed. My head is getting dizzy with figures.

WEATHERING TESTS OF BUILDING MATERIALS. Here they are speeding up the processes of nature. Specimens of stone, brick, tile, terra cotta, what you will, are tried out by two processes. In one they cook it and freeze it and thaw it and freeze it and soak it, and so on. In the other, which is quicker than the freezing method, they soak the specimen in a solution of calcium sulphate and allow it to dry. This is a very severe test and duplicates

a form of failure often observed in buildings where moisture charged with mineral salts can seep to the surface and evaporate there. I could have avoided trouble on that building if I had only known this.

CERAMICS. Here they can produce ceramic materials and have been studying glazes for terra cotta and the like. Weathering tests, studies of effects of expansion, and so on *ad infinitum*. Oh me! Oh my!

WINDOW GLASS. And they are studying window and plate glass: such things as measuring the pressure required to burst glass of different thicknesses, and assistance in preparing window glass specifications.

FIRE TESTS OF ROOFING MATERIALS. Tests going on to find out the relative fire resistance of different kinds of materials.

Just at this minute, with a thoroughly dazed mind, the Secretary stepped into a mud puddle and Fortune's Overshoes came off, and he found himself standing on the outside of one of the buildings with a party of delegates waiting for the bus to come and take them on to Arlington. And then came the idea that he would try to give a little picture of what he saw, and then the query as to how all this work could be used, and how the information could be made available to those who wanted it. A note is appended telling anyone interested how to go about getting such information.

36. The Secretary claims this 57th Convention was one of the best. He regrets one thing very much, and that was the enforced absence of the Secretary of Commerce, Mr. Hoover, because of illness, and also that of the Director of the Bureau, Dr. Burgess, out of town on urgent business. The Secretary is happy to know that Mr. Hoover's indisposition was but a brief one. He wishes to extend to the Department of Commerce and to the Bureau the thanks of all those who were so fortunate as to make the delightful trip of inspection.

NOTE: The equipment of the Bureau of Standards laboratories is probably the finest in the world for investigational work. It is housed in 14 permanent and several temporary buildings located on a 35 acre tract of land a short distance beyond the more thickly populated portion of the City of Washington. It is easily reached by the Chevy Chase car line or by automobile along Connecticut Avenue.

The Bureau is required by law to carry out tests or investigations requested by the National or State Governments without charge. In the case of private individuals, certain investigations are undertaken the results of which would seem to be of benefit to the public, the Bureau reserving the right to use the data thus obtained as it sees fit. Some routine testing is likewise done for private individuals and manufacturers where no commercial laboratory is fitted to perform the work. In these cases nominal fees are charged for testing which are turned in to the Treasury Department.

Results of the Bureau's investigations and researches are made available to the public through its publications. These comprise five series entitled: Scientific Papers, Technologic Papers, Circulars, Miscellaneous Publications, and Handbooks. They may be bought from the Superintendent of Documents, Government Printing Office, Washington, D. C. Circular 24 of the Bureau of Standards with its supplements comprises a list of all the publications issued by the Bureau to date. Those interested in scientific work in general will find this circular useful for reference purposes. Others desiring lists of the Bureau's publications along specific lines may obtain mimeographed lists of this sort from the Information Section of the Bureau. A great many of the reports are briefed in the Structural Service Department of THE JOURNAL OF THE AMERICAN INSTITUTE OF ARCHITECTS.

EDWIN H. BROWN.

A Reconstruction of the Basilica of Constantine in the Roman Forum*

NORTH APSE

Contemporary with the construction of the entrance on the Via Sacra was the addition of the apse at the north. That this is not part of the original structure is shown by the absence of bonding into the wall, and by the fact that the edges of the openings which originally pierced the rear wall of the central bay, can still be traced in the brick-work which was cut through when the apse was built. As the lines of these openings run to the floor we must conclude that at some period in the construction three doors were planned to open into the central bay at the north from the street which bounded the basilica on this side. This would have necessitated some adaptation to the steep grade of the street. The apse is not a true semicircle, but a segment on a chord 57 feet long. Possibly the objection to blocking the street at the rear prevented the construction of a true semi-circular apse, though the flattened type occurs occasionally in other buildings such as the large hemicycles of the forum of Trajan. The basilica-like structure found at Ostia was planned to have two hemicycles in adjacent walls[67].

At the entrance to the north apse, on the line of the original rear wall, a marble threshold is still in place. This shows spaces for the plinths of two columns which divided the entrance into three parts.[68] A cutting in the sills between the places for columns shows that the tribunal was separated from the hall by a screen, probably of marble.[69] The portions of cipollino shafts lying

* The two preceding parts of this article appeared in the JOURNAL for February and April, 1924, respectively.

[67] Not. Scavi, 1916, pgs. 405-408.

[68] Rivoira, Arch. Rom. p. 202 cites similar decorations in the basilica of Atricoli.

[69] Middleton, Op. Cit. of marble; Ashby, mss. of Top. Dictionary, bronze.

FIGURE 11—NORTH FROM THE EXTERIOR (KINDNESS OF SENATOR LANCIANI)

at the southeast of the basilica are of suitable size to have stood at the entrance to the apse. The ends of the wall into which the apse cuts were finished with pilasters. A capital of proper dimensions and base are lying nearby. (Figure 12.)

The position of the architrave which the columns and pilasters carried is shown by breaks in the wall ends at the height of the top of the columns.

Three blocks of a marble architrave sculptured with mouldings on both sides and therefore planned to stand free are lying against the north wall. These are of the dimensions required for the architrave over the columns at the entrance to the apse. Two of these architrave blocks were separate from the blocks of the frieze. The third is in one piece with the frieze block which is, however, cut back for the insertion of the sculptured slabs. A portion of one of the latter has been found and affixed to the wall. (Figure 13.)

The workmanship is crude but spirited. It is carved with a putto in a garland and with a palmette. Nibby[70] pointed out that this is similar in design to the decoration of the porphyry sarcophagus of Santa Costanza now in the Vatican. We have also a portion of the cornice which modern excavators have set up as a part of the entablature. That the various sections of the entablature were cut differently according to the size of the blocks available is the case not only here but also in the entablature which rested on columns along the rear wall of the apse. Architrave and frieze are cut in single blocks in some sections, in two in others. One is pieced along a diagonal break from top to bottom. The ancient clamps show that this break is not due to a fall from the wall. We have placed statues above the entrance, one over each column, a frequent Roman practice.

The marble blocks of the architrave and the column fragment show various cuttings. The large architrave blocks have rectangular cuttings in the centers of the ends. These probably served for the insertion of metal to which chains could be attached for hoisting or in which tongs could catch. The smaller pieces show lewis holes undercut on both sides. The clamps were of the hook variety; the dowels of the pour-channel type. Pry holes of the ordinary type were cut in the top surfaces of the stone courses to pry the stone above into position. The sizes of all these cuttings vary according to the uses for which the blocks were intended.

No description of the pavement of the apse is given by the early excavators. A close examination of the concrete bedding at the original floor level furnishes a clue to the pattern. A disk enclosed by a square occupied the center

[70] Del Foro Romano, p. 206.

FIGURE 12. PILASTER CAPITAL

FIGURE 13. SLAB OF FRIEZE

of the space. Oblongs adjoined the sides of the square with smaller squares enclosing circles at the four corners. There are no definite traces to the right of this central design. To the left the space was divided into squares and rectangles in the largest of which there was a circle. Possibly the smaller units were also subdivided by the insertion of circles or diamond shaped slabs.

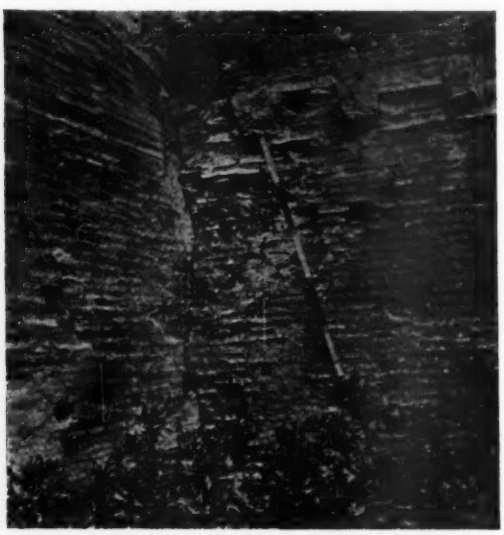


FIGURE 14. TUNNEL (KINDNESS OF SENATOR LANCIANI)

Around the wall of the apse ran a platform two steps above the floor level. There are a few small fragments of the serpentine veneer of the wall of the apse in place above the platform which served as a base for the judges' seats. In our restoration we have placed marble chairs here. The spaces between the brackets which adorn the wall are each three times the average width of ancient thrones. The pedestal-like construction in the center could not have been a dais for the prætor's seat as is generally assumed, since the brackets at the sides are too close to the platform to have allowed for the construction of a stairway which would have been required to make the top of the platform accessible. The curving wall at the front of the platform is part of the original construction which probably supported a statue in the large niche in the center of the wall. We have assumed that the movable currule chair[71] of the prætor was placed on a lower platform which projected in front of the curved wall. The present platform with the smooth thick slab of marble embedded in the concrete and the others which cover it was probably modified to this form to serve as an altar when a chapel was constructed in this part of the basilica in the Middle Ages.

The sockets on either side of the top of the larger central niche probably contained brackets which supported statues. Originally there were an arched niche of nine

[71] Abbott, Rom. Pol. Inst., p. 343.

feet in the center and two tiers of niches, five feet high, in the wall, probably containing statues, somewhat on the principle of the exedrae of the Forum of Augustus. Between the lower niches were small Ionic columns of cipollino resting on brackets. Many of the shafts and capitals are still available. The brackets which were found have been re-set. They are carved with putti or victories and garlands. There are palmettes at the sides. The columns supported an architrave, all of the blocks of which were found in the excavations. Five small windows, filled in at a later period but clearly traceable in the brick facing above the higher niches, gave light to the apse.[72] We have fitted these with bronze screens.

Stairway at Northwest

In the north pier of the west wall, a small door between the first two niches from the nave gave access to a circular staircase. This continued directly to the roof of the nave where it turned as did the corresponding stair at the east. The falling of the upper section of this stairway makes it available for only 52 steps. It is lighted by small splayed windows in line at regular intervals on the outside of the wall. The broken section of masonry lying on the floor of the Forum of Peace shows how the transition from the spiral to the straight stair of the buttress was managed. There were no similar stairs in the south piers of the building as is sometimes stated.

On either side of the west apse a small door led out from the central hall; that at the right opened on an exterior staircase to the street level, the door at the left communicated with the subsidiary rooms, which are to be described.

Use of Remains of Earlier Horrea-Rooms at the West

Since the main hall of the basilica did not extend along the Via Sacra as far as the oblique street to the Carinae, the triangle space bounded by these streets and the end wall of the basilica as far as the apse (see ground plan) was utilized for the construction of small rooms, reached from the main hall, and probably used to keep the records of the court which met in the basilica. The floor level of the hall is more than 19 feet above that of the warehouses which formerly occupied this part of the site, so that cellars were left under the rooms and were probably accessible from them by a temporary wooden stair. The cellars may also have opened directly on the side street. The rooms above the cellar were one story high, and seen from the Via Sacra, balanced the single story narthex at the other end of the main hall. The extended front wall concealed the outline of the lower part of the apse from the street.[73] A large arched window in the front wall, now visible from the inside of the wall but blocked along the Via Sacra, gave light to the room. The cellars may have had windows at the side.

The brick walls of the warehouses of the Severi can be traced in the embedded small rooms of the construction of Maxentius. He thickened the earlier front wall by building on both sides of it, filling in part the space between the piers which were wider than the connecting walls. The end wall of the basilica is built against older transverse walls. This wall shows by the bondings that it was modified after its original construction. Two walls parallel to the Via Sacra, which divided the rooms of the warehouses into rows, exist in part, so that it is probable that the same divisions were retained in the cellar of the small rooms of the basilica. We have assumed that the upper room was also divided. The outer wall of the smaller room ran straight back from the front wall to the depth of two of the rooms of the warehouses, then diagonally joined the wall of the cellar of the apse at what had been the rear corner of the fourth row of earlier rooms, which was shorter than the two front lines of rooms along the Via Sacra.

The wall which formed the rear of the fourth row of rooms is partly built into the cellar wall of the apse.[74] This cellar was entered directly from the street and did not communicate with the cellars of the other rooms. The door is outside the end wall of these rooms. It is part of the original structure for the arch, while the use of *bipedales* (large flat bricks) as voussoirs proves its Roman origin. The pavement is of tile.[75] The roof rests on two piers of the earlier buildings, which were strengthened with an additional thick enclosing coat of concrete. The space between these two piers is roofed with a short barrel vault intersecting another which forms the outer portion of the ceiling. This circumambient vault is wider at the rear of the apse than at the sides, [76] giving an elliptical section parallel to the main axis and a semi-circular section at right angles to the main axis. A flat wall closes the cellar along the diameter of the apse. The vaulting was constructed on a wood centering over which a thatch was placed before the concrete was poured, as may be seen by the marks of reeds still plainly visible on the under surface.[77]

The originally small doorway at the right of the apse from within the building, at the level of the floor, was later filled in, but it can be traced on both sides of the wall. We have restored this as opening on a flight of steps leading to the level of the side street. At this point a tile pavement fills the angle between apse and wall, though partly concealed by later debris.[78]

Tunnels

Since the west portion of the north wall of the basilica came close to the wall of the Forum of Peace, the street to the Carinae was entirely blocked. To obviate this, a tunnel (Figure 14) was built in the substructures of the basilica at the northwest and a gigantic buttress constructed to carry the superincumbent corner. Structural arches to relieve the weight of the superstructures

[72] These were recognized by Desgodetz, op. cit., p. 107.

[73] In the early Christian basilicas of North Africa the apses are sometimes flanked by square sacristies so that the side walls of the buildings form a continuous straight line. Gauckler, Basiliques Chrétiennes, pgs. 8 and 10.

[74] Senator Lanciani has kindly shown me a drawing made at the time of the excavations, when this could be seen.

[75] Not. Scav., 1879, pgs. 312-313.

[76] This shows an adaptation of the circular barrel vault springing from a central pier which roofs the basement of the tomb on the estate of the Cordians near the Torre degli Schiavi, and the chamber under the Heroön of Romulus near the Circus on the Via Appia.

[77] This was noticed by Middleton, Remains I, p. 67; Ashby, P. B. S. 1, pgs. 158, 9; Lugli, Bull. Comm., 1915, pgs. 160-164.

[78] Not. Scav., 1879, l.c.

are visible in the wall over the entrance from the street to the Carinae and also at both sides of the rear wall of the basilica under the windows of the northwest bay. These structural arches as well as the close and well-fitted bricks of the arch which roofs the tunnel, show that it is part of the original construction.[79] The tunnel is about 12 feet wide, 50 feet long[80] and 20 feet high. It has the same level as the Maxentian cross-street. The lower courses of the walls are formed of blocks of travertine. Those at the entrance project inwards from the wall. They are joined together very unevenly and were probably covered by an original ornamental framework for the entrance, or they may have served to keep wagons away from the walls. The hub marks at the right where the block projects further, are less deep than those at the left. The floor is paved with tiles, some of which bear the inscription OFF SRFOCEN.[81] This level was original, but it could not have been kept for a long period as the lowest line of hub marks is 44 inches from the ground. This would have been made by wheels eight feet high if they passed on the level of the tiles. A second line of marks is 27 inches above the first. The floor is level, so that the slope to the north at this point must have been negligible. The road along the north of the basilica was, however, steep, as its level at the west, at the exit of the tunnel, is 22 feet below that of the road which meets it from the Via Sacra at the east; the rise is more than 7%.

Material

The construction of the basilica represents the greatest daring in ancient Roman times in the use of brick and concrete,[82] although the facing lacks the finish of the earlier periods. Irregularities in the thickness of the walls were trued up by the mortar coating which served as a backing for the marble veneer. The concrete core of the foundations has a rubble of selce and refuse material. In the walls broken brick, laid in irregular rows, are used. The rubble of the vaults shows a large proportion of lighter pumice.

There is also a quantity of marble, charred brick and even bits of wood in the concrete. We have not been able to find any traces of jars in use in the available portions, although Rivoira says that they were employed in the basilica.[83] The mortar is characterized by fine lumps of red pozzolana and fairly good white lime. The facing of the walls consists of bricks of various types.[84] Many of those found have the stamps of Domitian. Broken tile bricks of the period of Severus are also frequent. The general color of the bricks is a dull red with a conspicuous admixture of bright orange and clear lemon yellow bricks of the time of Aurelian. The yellow bricks are generally only about six inches wide. The height of the bricks varies from one and three-eighths to one and five-eighths inches. The length rarely exceeds a foot. The horizontal joints are wider than the bricks themselves in some cases and very irregular. The vertical joints are somewhat narrower. Bonding courses of thick yellow tiles occur at an average distance of 56 inches.[85]

Method of Construction

The line of the barrel vaults is behind the walls between the bays: the projecting portions of the piers behind the columns thus afford stability in case of earthquakes.[86] The Sessorium, in ruins near Santa Croce, a slightly earlier building, was so unstable that Constantine had to add buttresses to prevent its collapse.[87]

The walls were built with the aid of scaffolding. The holes for the horizontal supports of the successive platforms generally occur above each bonding course, at intervals of nearly five feet, the greatest height that a workman can conveniently reach in laying bricks.[88] As already stated, wood centering was doubtlessly used for the vaults. The bricks were laid on the lines of the groining in double rows with larger bonding tiles at intervals. The space was then filled with rubble. When the man ribs had set, they served to support the centering for the intervening sections.

It has been the fashion to disparage the basilica of Constantine as the characteristic product of a period of decadence. Aside from the fact that it displays the highest technical skill in the use of brick and concrete to which the Romans attained—namely, in the construction of the great groined vaults—the building was not ungraceful. It is true that it does not follow the proportions of length to width (one-third or one-half to one) laid down by Vitruvius. It is clear, however, that the Augustan architect was influenced by the type of basilica consisting of a central hall surrounded by a two-storied colonnade. Crudeness in detail was not noticeable in much of the decoration because of the height above the spectator at which it was placed. The costliness of the marble employed, the gilding and the numerous statues, 57 according to our restoration, contributed to form a magnificent ensemble. The three ruined bays are impressive today as they tower above the Forum, visible from many parts of the city. The proportions of the nave, with its eight huge columns, when viewed from the narthex at the east, could not but have impressed the spectator with its dignity and grandeur. Finally, the structure is of great interest in the history of architecture as practically the last great monument of pagan Rome[89] and the prototype of many of the great churches of Europe.[90]

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[79] Lanciani, Storia Scavi II, p. 218-19; Not. Scav., 1879, pgs. 312, 313.

[80] Measurement of length is given by Thédénat. Tunnel is now inaccessible beyond entrance.

[81] Lanciani's record made at time of excavation. Those near the front are now nearly illegible.

[82] A century later buildings were constructed entirely of brick as S. Giovanni in Ravenna (a. 425) and the Mausoleum of Galla P'acidia (a. 440); Rivoira, Lombardi, Arch. I, p. 22, 28.

[83] Op. cit. p.

[84] In the Circus of Maxentius on the Via Sacra, built in 309, tufa blocks alternating with rows of bricks are used as facing for the first time. This method became general a century later.

[85] Rivoira, Arch. Rom., p. 95, bonding from 8 to 56 course.

[86] Durm, p. 261. Nibby considered it a defect that the arches are not semi-circular.

[87] Rivoira, Arch. Rom., p. 185.

[88] Rivoira, Arch. Rom., p. 111 reproduces a picture from the tomb of Julius Justus on the Via Latina, showing masons at work.

[89] The baths of Constantine on the Quirinal are slightly later.

[90] Rivoira, p. 250, states that Santa Sophia in Constantinople was modelled after the Basilica of Constantine.

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Public Information

As the season draws to a close, Public Information activities in many of the Chapters seem to decrease. This ought not to be, as the reading public is just as approachable in the summer as in the winter and in some instances even more so. Business men who have been rushed to death in the winter often find time hanging heavy on their hands either in the deserted city or over the weekends with the family, and they devour the newspaper from title to want-ads.

Chicago reports that it is continuing its publication of articles in the *Chicago Sunday Tribune* and the *Chicago Herald and Examiner.* The papers show willingness to publish this matter and everything sent to them has been set up in type. But the time of publication is sometimes deferred. Paid advertisements govern the quantity of reading matter issued by the paper and as these articles have always been placed in the Real Estate and Building Sections, pictures and descriptions of new buildings have taken precedence over the material contributed by the Chapter.

Indiana has sponsored two lectures on "Elements of Modern Architecture Applied to Commercial Buildings," delivered by Fermor S. Cannon, the Chapter's Secretary, and dealing with the evolution of building, leading up to the zoning laws. Appropriate diagrams were discussed and reproductions of the buildings were displayed. The Chapter feels much encouraged by the result of this work.

New York has been keeping up a steady fire of notices and articles in the local press, sending out an average of eight to ten a week. In some instances, short articles and notices have been written by the Committee. In other cases, they have given the information to a newspaper reporter and he has written the story.

John V. Van Pelt, *Chairman,*
126 East 59th Street,
New York City

Ups and Downs in the Modern Building[1]

THE MODERN skeleton-frame curtain-wall building had its birth in Chicago so recently as 1884. From that time to the present day, a period at the beginning of which most of us were alive, a revolution in the design and construction of buildings has occurred the like of which is unknown in the history of architecture. Think, if you please, back to those boyhood days when Trinity spire and the old shot tower east of Broadway stood high above the low level roofs of New York. Compare this memory of yesterday with today's towered reality, and you may gain some inkling of the extraordinary change which has taken place in the building industry during the past forty years.

Need I remind you that the modern building and the elevator have grown up together? Of course, this is not only true of the elevator. It is also true of modern sanitation and water supply, of modern methods of heating and ventilation, of the incandescent lamp and modern illumination, of electrical distribution and utilization, of methods of signaling and communication; in short, of all those mechanical and electrical arts which make the modern building work, or, lacking which, the building fails to work. For verily the modern building is no mere housing, it is a machine. Machines which are not economical, efficient and thoroughly adapted to function are either never built, or if built, are soon consigned to the scrap heap. Here is a lesson which, it seems to me, the building industry has yet to learn from the mechanical industries. It is a subject I have already enlarged upon in another place,[2] so I need do no more now than draw your attention to it. Here I wish to touch upon a few aspects of the particular relations of modern elevators to modern buildings.

Of course you know that it is quite useless to erect buildings of any great height unless an adequate and suitable means of vertical transportation is provided. By adequate and suitable I mean that the elevator facilities for such transportation are so arranged, and of such capacity, that the number of people desiring to use the elevators can be moved with safety, with rapidity, and with reasonable comfort.

That the elevator traffic problem is a real one will be evident if I tell you that the total number of passengers carried in one day in the passenger elevators of New York City is more than twice the number of passengers carried the same time in all the horizontal transit facilities of this city combined. Furthermore, the same traffic conditions which determine the capacity and suitability of a subway line also determinine the capacity and suitability of an elevator system. Both are problems in railroading, and precisely as the primary factor affecting the selection of railroad equipment is the traffic and its character, so it is with the selection of elevator equipment.

Only indirectly is the elevator problem a matter of floor area served. Many mistakes have been made by using some rough ratio of square feet rentable area per elevator. It is safe to use such a ratio only for buildings of approximately the same total floor area, approximately the same number of floors and used for the same purpose by the same kind of people. That such a rule-of-thumb method is unsound is easily shown if we consider two buildings having the same total floor area, but in one case spread over, say, five floors, and in the other case divided among 25 floors. I need hardly waste time telling you that the elevator equipment suitable for the one building will be totally inappropriate for the other. This difference will be more marked if we populate one building with bankers and brokers, and populate the other with professional tenants.

The total floor area and its distribution among floors is important only as a means of estimating the total probable population and its distribution. Thus we learn approximately how many people must be handled by the elevators and about where they will want to go. Then, from a study of the general rental situation and its tendency in the district where the building is to be erected, we may get some idea as to the class of tenancy and how it will behave. These last factors are of great importance, for from them it is possible to set up the probable time distribution of traffic. It makes all the difference in the world whether the population largely works by the clock or is more or less casual, whether it stays put, or is constantly coming and going.

It is also necessary to study the future—to decide, or, rather, to guess as intelligently as may be whether the district is developing or changing its character; whether within the next decade the building may fill up with large corporations, or be invaded by the clothing industry.

May I take the time to suggest that you consider the apt statement made by another that "the passenger is the standard automotive package that stacks itself in one tier?" Passenger elevator engineering is but a special case of freight elevator engineering, but in the case of the passenger elevator, some packages, so to speak, come in white paper tied with silk ribbons and others come in gunny sacks tied with jute cord; some are in the class of perishable express, others are slow freight, and all are marked "charges collect."

Thus, from an estimate of the traffic class or class of tenancy, the character of the desirable service may be determined. It is concerned with two questions. First, how long can a passenger be expected to wait for a car. and,

Second, having entered the car, how long can the passenger be expected to remain in it without writing a "raspberry" to the agent just as soon as he reaches his office, or on the morrow after having just missed his train the night before.

This question of service is very important for elevator service gives the impression of the building. I suggest for your consideration the following classification based on interval and on round trip time. The interval is the average time between cars going in one direction at the

[1] An address delivered before a group of real estate operators in New York.

[2] "The Modern Building Is a Machine."—*American Architect*, 30 January, 1924.

intermediate landings. The round trip time is the average time between the successive departures of any one car from the main or ground floor landing. The interval and round trip time together constitute the time table key—the information which enables us to reach a decision as to whether or not we are willing to commute over the line.

Class	Interval	Round Trip Time
Super Service	Less than 20 sec.	Less than 120 sec.
First Class	20 sec.	120 sec.
Intermediate	25 "	150 "
Low Grade	35 "	180 "
Casual	35 "	210 "

This classification is based on a long statistical study of elevator traffic and its effect on the tenants. I do not think it is exaggerated. Nevertheless you will recognize that comparatively few buildings even attain to intermediate elevator service.

Just as the time between trains determines the number of cars in the train, so does the interval between elevator cars determine the car size and its load. Only a given number of passengers can be loaded and unloaded at the ground floor during the interval time which is the maximum time the car can stand at this floor and still maintain its schedule.

The number of elevators in a bank required to maintain the desirable service is related both to interval and to round trip time. The interval being taken as fixed, the round trip time becomes the variable to be determined. It depends on a number of factors including the travel, number of stops and the velocity characteristics of the equipment selected. It is an interesting and important fact that the number of stops a car containing a given number of passengers will make, can be calculated to a surprising degree of accuracy by the method of probabilities.[3]

Now I think it is obvious that after the average round trip time has been determined by calculation, then dividing this round trip time by the interval gives the number of cars in the bank required to maintain the service. Therefore (and this point I particularly wish to emphasize), when, and by whatever means, the round trip time is reduced by an interval, the desirable service may be maintained by one less car, or, contrariwise, with a given number of cars, the service may be equivalently improved.

This possible reduction in the number of cars is not always advisable. In the first place the necessary added equipment on the remaining cars costs real money. In the second place, the reduction in the number of cars makes a shut-down of one of the remaining cars a more serious matter, for one car out means a considerable reduction in the capacity of the plant. Thirdly, with the fewer cars the importance of maintaining the schedule becomes of greater moment. Fourthly, good service in elevators, like good commuting or transit service, tends to slow down by increased traffic.

However, when we are faced with the problem of buildings having more than 16 floors; several banks of elevators are necessary. This is because a bank of more than 8 cars is not a practical operating arrangement, and often many more than 8 cars are required to handle the traffic. Then, as the travel increases, if the service on the high rise banks is to compare favorably with the service on the low rise banks, less and less floors can be served by the high rise banks.

This requires an inordinate number of cars, unless either service to the upper floors is sacrificed, or the round trip time of such express cars can be decreased. Furthermore, due to the zoning law, the restricted floor area on the upper floors makes this floor area an economic asset to the building only if it be not seriously reduced by elevator hoistways.

How Service Is Accelerated

I think it can be easily shown that where such conditions prevail, it will pay, and generally pay well, to reduce the number of cars in the high rise banks by every means at our disposal. And this, as I have said before, means reducing the round trip time.

There are several possibilities to this end, most of which I have had the opportunity to work out and to apply in several recent installations.

Obviously, increased speed comes first to mind. There is no insuperable mechanical or safety reason why any limitation should be placed on velocity. At this moment we are traveling at the rate of 25 miles a second relatively to the sun and do not realize it. We travel at the rate of 6,000 feet a minute over railroads and calmly eat our dinner or read a newspaper. So far as I can see there is no reasonable likelihood of our ever wanting to travel vertically at anything approaching such velocities. But to put an arbitrary limitation on elevator speed is both unreasonable and unintelligent.

It is not velocity which matters, but how you get up to the velocity and how you come to rest which counts, and this is purely a matter of speed control. With proper control I, myself, and with perfect comfort, have reached velocities in elevators approximately 1,000 feet a minute in three seconds from standstill, and today I am specifying elevators for regular passenger service that reach a velocity of 800 feet a minute from standstill in four seconds. These velocities save time on the express runs. Comparatively speaking, they save little on local stops.

This phase of the problem—the study of the effect of acceleration and retardation on the passenger's bodily and nervous system—involved a year of experimental research. The general solution has been made public.[4]

But experiment indicates that no stops can be made accurately by car switch at these speeds and rapid acceleration. Stops must be automatic, and so the time consumed by false stops made at ordinary velocities with manual car switch operation, and the resulting "inching" to landings is eliminated. Such false stops ordinarily exceed 50 per cent of the normal stops.

Next, we must save the time consumed in operating car gates and landing doors by hand. Such manual operation consumes from four to five seconds per stop.

[3] "The Probable Number of Stops Made by an Elevator." Jones, *General Electric Review*, Vol. XXVI, No. 8, p. 583.

[4] "The Time-Velocity Characteristics of the High Speed Passenger Elevator."—Jones, *General Electric Review*, 24 February, 1924, page 111.

Here much time is lost. I have specified and obtained power operated devices for gates and doors which complete the opening and closing cycle in two seconds, silently without material rebound, and which will stop if a passenger is in the way. The gates and doors are interlocked with the car operation and leveling devices so that the gates and doors are opened automatically, and fully open when the car reaches the landing. The car cannot leave the landing until both gates and doors are closed and locked. Then the car departs without any further action on the part of the operator. No passenger car should be operated without a car-gate and interlocks. Over 80 per cent of the accidents to passengers are due to the omission of these devices.

Time is also lost through the bad memory of the operator. It requires a certain mental gift to remember six or more numbers called in any order by as many different people. So the operator passes landings and has to go back. This, I have corrected by giving the operator buttons, one for each floor to push when the number is called. Once any button is pushed, the car will stop at that landing and automatically open the gates and doors without any further action on the operator's part.

Thus the working of the car is as nearly automatic and fool-proof as reasonably possible, and, what is more, it is safer than the usual hand-operated equipment.

There is yet another place where material time may be saved. This is in speeding up the waiting passengers on the landings. I am using lanterns with 75 watt lamps, red for "down" and green for "up," so that not only is the lantern bright in competition with the illumination of the corridor, but also the color of the signal is distinct for both directions.

The landing call buttons are tied into the car control, so that operating the button automatically stops the car at the landing unless it is by-passed. The operator does not necessarily know that the car is going to stop. His job is not to bother about the signals but to speed up passenger movement.

You will note that to a considerable degree the car is operated by the passenger who merely registers his desire in the control apparatus. The car is literally signal-controlled. The operator almost becomes a guard or policeman who requires but little training and need not be possessed of any marked skill.

Lest you associate this elevator with the ordinary push button private house elevator, let me assure you that it is quite a different breed. For about a year the first machine was run under very severe factory operating conditions before any attempt was made to complete the installation.

And now, since with the reduced number of cars maintaining the schedule becomes important, I am using an automatic schedule machine which withdraws signals and by-passes them if a car gets behind time. This machine keeps both the starter and the operator informed as to whether the car is on time, ahead of time or behind time, and also when the car should leave the ground floor. The whole device is adjustable so that the schedule may be set by the starter or despatcher to suit the traffic.

Obviously it is quite as important, if not more important, for the starter to know what is happening to the waiting passenger than it is for him to know what is happening to the car. Therefore I have substituted, for the usual position and motion indicator, a waiting passenger-indicator which informs the starter when a landing button has been pushed and when the call has been answered.

Lightening the Owner's Financial Load

I have gone into this matter in some detail, first because of its peculiar interest, and secondly, because so far as I know it represents the first effort to meet the traffic conditions in the modern tall building built under the zoning law.

I count myself fortunate that the client for whom this was worked out was patient enough and far seeing enough to realize that in spite of the apparent high first cost of the individual elevators, and the possible delays due to the development of new devices and apparatus, it represented sound economy in building operation. The saving to him is just this: At the usual velocity of 600 feet a minute attained in 5 seconds from standstill with manual car and door operation, 8 cars would have been required to maintain low grade service with a 30-second interval. This poor service, together with the loss of already restricted floor space, raised a question as to the advisability of erecting the building above the sixteenth floor. But it was estimated that six push button signal-controlled cars will maintain first class service with a 20-second interval. Therefore, two hoistways and the corresponding corridor in grade A rentable space are eliminated on twelve floors—a total of approximately 3,000 square feet, and a further 3,000 square feet of grade B rentable area in the lower parts of the building. Shall we be conservative and put it all in at $3 a square foot per year? Then here alone the owner saves about $18,000 a year. Two operators, at $1,800 a year are eliminated. If the building manager is paying less than this for operators on manually operated machines, he is probably wasting money on his elevators. Two hoistways through 30 floors with fronts and doors are eliminated at at least $400 per floor per hoistway, a total in first cost of $24,000. Let us put this in at 10 per cent on the money, or $2,400. Comparing the 6 cars with the alternate 8 cars, the owner saved about $20,000 in the first cost of elevators and signals alone, which at 12 per cent is $2,400 a year. So the total annual saving is at least $26,400 a year, which to be conservative represents an investment of $264,000 at 10 per cent. But most important for both owner and architect, the change made the projected tower a practical possibility.

If a general statement will not be taken too literally or misinterpreted, I may say that elevators of the special type described above will give 25 per cent better service than an equal number of elevators of the entirely manually operated sort traveling at 600 feet per minute attained in 5 seconds from standstill. At least recent traffic measurements have indicated the possibility of an improvement of this magnitude.

I have another case on hand in which without the push button signal control, but with high car speed, power operated gates and doors and automatic stops, 3 elevators have replaced 4 and possibly 5 in a very much restricted floor plan. I have yet another very high grade structure, designed and partly built without proper elevator engineering advice, in which the use of the push-button control together with all the rest, brings the service from casual up to intermediate. In this case only a given number of cars could be used, neither of the best size or shape for the case, and unfortunately restricted as to arrangement.

The Effects of Inadequate Systems

This is a difficulty which I often have to face. The architect has prepared his plans, even let the steel work which may be in course of erection, and has provided hoistways either of insufficient number or of such dimensions that cars of the proper size and shape cannot be installed, or he may have done both. As I have previously told you, the size of the car depends on the service required. The better the service the larger is the number of cars required, and the smaller need be the individual car. The shape of the cars is quite as important as their number. The deeper and narrower the car, the longer is the time required to load and unload passengers. In many cases which have come to my attention this question of car shape has proved to have a very serious effect on the service.

In this connection you may be interested in one or two cases. Some time ago I was called in to study an elevator system in a very important building which had proved to be inadequate. A traffic study indicated that practically normal conditions for the type of building and class of population existed. The primary trouble was the existence of too few cars, of slow speed and very poor shape. A count showed an actual maximum standing time at landings of nearly a minute. It was necessary nearly to empty the car and refill it so that a single passenger could get out.

In another recent case a traffic study showed a rather interesting condition. As is common with this particular character of building, chiefly occupied by bankers and brokers, the population has steadily increased for several years, and due to the increased use of runners and messengers, the interim traffic, or traffic between the arrival and departure peaks, had reached a value only slightly less than the arrival peak. The arrival peak was approximately normal for this class of tenancy, but due to the crowded conditions partly brought about by the use of narrow deep cars, the peak had spread out over a considerable period of time. This is interesting as it shows that the population, like the subway traffic, has to a certain extent adapted itself to the situation. Those who can come and go earlier or later as the case may be. Increasing the capacity of the elevators would reduce the duration of the peak to that extent, but would not decrease its amount.

A careful statistical study of this case showed that the only possible solution was a complete remodeling of the entire elevator equipment, including increased velocity, power operation of gates and doors, and—most important—a change in the size, number, shape and arrangement of cars. In other words, the radical medicine was a new elevator equipment from the ground up. This, for obvious structural reasons, was impractical, and the owner was advised either reduce his population or to change its class. These are merely typical cases used to illustrate the importance of proper traffic data as a basis for design.

Some Other Controlling Factors

I do not wish to leave this subject without drawing to your attention several matters relating to occupancy, not yet mentioned, which have a very definite relation to elevator traffic and hence to the design and arrangement of elevator plant. I will merely mention these subjects in passing. They are:

1. The increasing proportion of females among the tenants, who require special toilet facilities. For various reasons women visit the toilets much more frequently than men. If this requires use of the elevators, it may result in a material interfloor traffic, and will increase the round trip time.

2. Restaurants and Clubs, if not located with good judgment, may seriously affect the elevator traffic.

3. When a single tenant or a number of connected tenants occupy several floors, a heavy interfloor traffic may result. In some cases this has seriously modified the traffic schedule on which the elevator plant was based.

4. In building occupied entirely or principally by one tenant, the resulting interfloor traffic may control the situation.

5. The arrangement of the elevator banks should be flexible, so that as the distribution of population among the floors changes, as it generally does, the bank serving the more densely populated floors will not become overcrowded.

These are matters which the renting agent must always keep in mind. He should be familiar with the limitations and capacity of the elevator equipment, and, so far as possible, guide himself accordingly.

In closing I wish to remark that many of the traffic data and timing observations brought to my attention, on statistical analysis prove to be inconsistent. Generally the methods of observation used are not based on correct fundamentals and are seriously in error. Only as such defects are eradicated can we hope to arrive at sound standards for comparison of elevator plants.

In this, as in other engineering fields the stop watch-slide rule method must be substituted for the kitchen clock-thumb rule method. We must cease designing elevator plants on hunches. It seems to me that the method of hunches is still a general rule in the building industry.

Bassett Jones.

"The New Poverty" in Architecture

IN THE pages of *Punch* nowadays one sees references to the "New Poverty." By the time the necessity for reducing expenditures and living in a simple style reaches the pages of a humorous magazine it is no longer—if I may use a bald paradox—a laughing matter. The war and the aftermath of war have cut into incomes in England; while the long period of unemployment, the harassing beggary which confronts one on every street in the bigger cities, and the threat of a socialistic organization of society which will still further reduce the opportunities of living by owning, have made the conspicuous display of wealth something worse than bad taste.

One might think that all this boded hard times for architecture; for the architect, as the preface to *The Smaller House*[1] says, has been faced with the necessity of building so that not a halfpenny be wasted. The result, on the contrary, has been to achieve within less than a decade a fresh orientation of architecture in England, which all the preaching of Ruskin and Morris, and all the practice of the last generation of vernacular revivalists, were not able, out of season, to accomplish. Here, at last, is something consistent enough to be called a style, and it belongs to no century but our own. Confronted by a dank smell, one no longer risks being informed, like the lady in *Punch,* that it goes with the Tudor period.

It is instructive to compare the achievements in *The Smaller House* with the excellent representation of *English Interiors in Smaller Houses.*[2] In even the more modest sort of house of the Renaissance, between the time of Wren and that of the Brothers Adam, the character of the formal design dominated the interior finish of a building: a Renaissance house remained what it was, no matter what local materials were at hand, no matter what the character of the landscape was, no matter what the disposition of the inhabitants. The Renaissance style developed in England during the period of riotous commercial enterprise which followed England's defeat of Holland, her rival for colonies and overseas wealth. During the eighteenth century the gains of the merchants and the great landed proprietors were supplemented by wilder adventures abroad, and by coal royalties from which some of Adam's patrons had begun to derive an income.

With a surplus of resources at hand, the main effort of the Renaissance architect was to display the elegance, the taste, the classic culture, and above all the wealth of his patron. In doing this, the color and variety of personal tastes were submerged: the subtle differences in cut and trimming which distinguish one person's dress from another's in everyday life were lost in the universal masquerade; to be one's self was to act in the character which had been assigned by those lovers of the classic past who guided the age. The great skill in craftsmanship involved in carrying out Renaissance designs in ornament, the thorough finish which characterized even the minor work, are qualities not unassociated with good building. Classic ornament itself, however, no longer can give us the æsthetic delight which it gave to Chambers and Burlington and their contemporaries; we see only an arrangement of forms in space, whereas they were inspired by a vision comparable to the vision of Platonic archetypes; they saw in the architecture of their time a fulfillment of a new civilization, a fulfillment which gave a special emotional color to each form.

Today this vision has faded. The New Poetry has stripped the masques from architecture and left the naked face; and we who live in a machine age, steeped in the sterile forms of a mechanical culture, are a little disturbed, perhaps, by the ancient facility for fancy dress. If a cold, utilitarian treatment is unsatisfactory, the ancient warmth and repletion is even more so. Just as the sculptor today had rather deal with the naked planes of the body than labor over the infinite varieties of fold and contour in fancy dress, so the architect has found it wise to center his creative efforts upon necessities—indeed, under the conditions by which domestic architecture is now being produced in England he has no choice. Sometimes the result is a little bare and anomalous, as in Mr. Louis de Soissons' house in High Oaks Road; sometimes it is decisively good, as in Sir Edward Lutyen's Middlefield; but always the result bears some sincere relation to the needs and requirements of modern life, and to anæsthetic sentiment more or less in harmony with the better aspects of that life.

The same simplicity has come into interiors, even though, as in the house at Long Wittenham, Berks, by E. G. Dawber, the scheme of decoration has all the delicacy and fineness of line which one associates with the most characteristic 18th century work. In the early days of the vernacular revival the chief designers—Morris himself, for example—were guilty of the very practice they reviled, namely, of copying the past, instead of living anew in the spirit they admired. There was, perhaps, a crudity and starkness in the early work which, however admirably it witnessed the honesty of the builder, had nothing to do with our own feeling and taste. Some of the modernists on the continent, on the other hand, in revenge for the historical piety of the established schools, have perhaps emphasized too heavily in their designs what was peculiar to our modern mechanical regime, forgetting that no matter how far we are children of the machine, we are still human, and require for our nurture and delight a somewhat different environment from that which a dynamo or a blast furnace would find to its liking.

In the modern English work we have been considering there is neither a crude return to the past nor a crude overemphasis upon the industrial characteristics of the present; some of the designs are strong, some are light and graceful; some feature the entrance, some the sleeping porch, some the loggia; some are bent on internal economy, and some are designed with an eye to the traditional fitness of the building in the landscape. Both

[1] The Smaller House: Being Selected Examples of the Latest Practice in Modern English Domestic Architecture. The Architectural Press.

[2] English Interiors in Smaller Houses: From the Restoration to the Regency, 1660-1830. M. Jourdain. Charles Scribner's Sons.

plans and elevations show a variety of choices as numerous as the variety in the character of the occupants, in their daily work, and the scene they walk about in; and yet the general characteristics of simplicity and directness characterize all the work which is here shown. The houses range in cost from £1,400 to £5,000; some are located in Welwyn or Hampstead, part of a group, and some are isolated on country estates. Without strain, without pretense, these houses compare favorably, it seems to me, with the best sort of work which has been done in America or on the continent. The English may well be thankful if the New Poverty has brought back in architecture some of that old skill which made a poverty of means tolerable before the coming of the machine.

Marginalia Architectura

One hundred and ninety-nine years ago, the second of March, there was born at Venice a great adventurer, Jaques Casanova. There is much of interest to the architectural profession and to the illuminati in general in the memoirs of this remarkable man. As Edward Maynial in his preface to *"Casanova et son temps"* says, one finds there one of those living documents, new and original, which constitutes a most valuable history of the society and manners of the 18th century.

Like Brantôme, Casanova spent the last twenty years of his life in writing his memoirs. He also wrote on a diversity of subjects including history, science, art and belles-lettres. One quaint title reads "Icosomeron, or the History of Edward and Elizabeth, who dwelt for eighty years among the Megameickes, the aboriginal inhabitants of Protocosme, in the interior of our Globe." (5 vols. Prague, 1788 and 1800. 8vo.) Another is "Corollary on the Duplication of the Hexædræ." (Dresden, 1790. 4vo.)

There has recently been unearthed at Dux a great quantity of his manuscript, in his lucid and beautifully written script. An essay on Manners, Science and Art in twenty-seven chapters (grand in-fol.) is a treatise on Slavery, Liberty, Well Being, Riches, Princes, Politics, Logic, Natural History, Chemistry, Mathematics, Theology, Courage, Atheism, Astronomy, Theosophy, Sacred History, Poetry, Architecture, Painting and the Latin Language.

During the forty-two days of his incarceration in the Citadel of Barcelona, he employed his time alternately in writing chapters on "The Refutation of the History of the Government of Venice" and for lighter amusement, pencil drawings of architectural plans and imaginary compositions! (There is nothing so soothing to the soul as imaginary compositions, the picturing of the market place in Ancient Carthage, the restoration of the palace of the Minos at Khnossus, or the Hanging Gardens of Babylon. (V. Wm. Walcot's Etchings for fine examples.)

* * *

At the early age of eleven, Casanova was a precocious child, as shown by the story of his answer in Latin pentameter to the question which an Englishman of letters put to test his pronunciation.

It may readily be imagined what an impression such a man, at the age of thirty-two, suffused with the halo of romance, fresh from his marvelous escape from "Les Plombs" (one of the most famous exploits in history, tense and seething with feverish ebullition), in the full flower of his age, rich, handsome and magnetic, would make on the impressionable heart of a beautiful young creature of the gay, golden days of the gallant 18th century. Such a one was Marie Madelaine Balletti, lovely daughter of Sylvia Balletti, the adored and adorable favorite of the Théâtre-Italien.

O! Mater pulcher, filia pulchrior, as Horace so fittingly remarks. Nattier painted the portrait of Manon Balletti as Thalia, and exhibited it in the Salon of 1757. The painter has represented her seated, enveloped in harmonious draperies, holding in her left hand a masque, and raising above a head crowned with ivy, with a movement of the hand and right arm full of natural grace, the curtain of the theatre. The face is of the most delicate oval, the eyes are well formed, brilliant and langorous, the cheeks fresh, the *bouche mignonne et charnu,* the eyebrows perfectly drawn, the bosom young, pure and firm. "In truth, if Nattier has not deceived us, Manon Balletti, in 1757[1] was a most lovely and gracious young girl," says Charles Samaran, who tells the story in detail in the chapter on "Les Amours de Manon Balletti."

* * *

For nearly three years, Casanova exercised all his seductive wiles in vain until Manon, who passionately adored him with all the fervor of her innocent young heart, finally tore herself loose from the basilisk, during his absence in Holland in July, 1760. Her fortunate decision was doubtless hastened and confirmed by certain details of a questionable nature that came to light about this time, concerning the adventurer's financial transactions. The old boy, who was rather hard hit himself, took the jilting in very bad grace and suffered a severe attack of the spleen coupled with a violent migrane that confined him to his room for three days.

"Be wise," wrote Manon, "and accept with sangfroid the news I give you. This packet contains all your letters and your portrait. Return mine, and if you have preserved my letters, do me the favor to burn them. . . . Think no more of me. For my part, duty compels me to do all in my power to forget you, for tomorrow at this time, I shall be the wife of M. Blondel, architect to the King and member of his Academy. You will oblige me much, if on your return to Paris, you will make the semblance of not knowing me, in case by chance we should meet."

[1] This portrait, catalogued "Comedy," brought only 15,000 francs at the Kraemer sale in May, 1913. Cf. P. de Nolhac, J-M. Nattier, painter to the court of Louis XV., Paris, Goupil, 1905.

François-Jacques Blondel, architect to the King and member of the Academy of Architecture, was in 1760 about fifty-five years old. He might easily have been Manon's grandfather, for she was scarcely twenty. By a previous marriage there was a son Georges-François, Architect of the Academy of Marseilles and professor of the School of Arts.

Blondel pére, however, was a man of knowledge and talent, highly esteemed for his many virtues and the great gifts with which nature had endowed him. It may be doubted that this mature and grave genius acted wisely in contracting a second marriage with a young girl more than thirty years his junior. The union, nevertheless, proved a happy one, and the Blondel ménage flourished for nearly fourteen years until the death of the architect on the ninth of January, 1774.

* * *

In 1761, on Casanova's return to Paris, he called upon Madame Vanloo, who asked him to stay to dinner. He accepted, but when he learned that Madame Blondel was to be one of the guests, he declared that as a man of honor he ought not to find himself willingly in a place where she might be.

The following day he learned from Madame Vanloo that Mrs. Blondel had asked her to thank him for his consideration but that Mr. Blondel was quite vexed not to have seen him and expressed to him all his obligation.

"It is not to me, but to Manon that he owes the obligation," said Casanova, "they tell me that they have a *joli poupon*,[2] and that Blondel lives at the Louvre while his wife dwells in another house, rue des Petits Champs."

"That's true, but he takes supper with her every evening."

"What a droll ménage!"

"Very good, I assure you. Blondel *ne veut avoir sa femme qu'en bonne fortune. Il dit que cela entretient l'amour, et que, n'ayant jamais eu une maitresse digne d'être sa femme, il est bien aise d'avoir trouvé une femme digne d'être sa maîtresse.*"

During the last years of her life, Manon was constantly assured of the affection and sympathy of such women as the beautiful Madame Carle Vanloo, architects, artists, writers, like Julien—David Leroy, the German painter Mannlich, and the good Michael—Jean Sedaine, dramatic poet and author of *"Richard Coeur de Leon," "Arline, Reine de Golconde"* and *"Le Philosophe sans le Savoir."*

Manon's second son, Jean-Baptiste Blondel, born on Christmas eve, 1764, became a famous Pontist (Arch. Nat., Y 12079, Comm. Defresne) and one of the architects of the city of Paris. A very wonderful family!

* * *

The high esteem in which the mediæval Latin students' songs (translated into English verse by John Addington Symonds) are held, emboldens us to refer to still another early effusion of Sir John Suckling's salad days—those rollicking nights (*sic*) when spring was in the air and the "merrie draughtfmenne" of Inigo Jones' office gave throat to "the fountain of the Bacchic chant swelling . . . with the rattle of the dice box ringing in their ears," while the gibbous moon hangs low on the timbered gables of the pothouse. (The Bear at the Bridge-foot?)

"Bacchus saepe visitans
Mulierum genus
Facit eas subditas
Iibi, O tu Venus."[3]

Like Horace's Ode to Lalage the words of these songs fairly leap out at one from the printed page. The manuscript is yellowed with time and the title, scarcely discernable, reads, "Ye draughtfmennes Springetyme Drinkinge Songe."

"Inne ye fpringe a richer colour comes upon ye festive brewe,
Inne ye fpringe ye wanton draughtfmanne cafts about for fomethinge newe,
Inne ye fpringe hif purse if fuller for hif jerkin's[4] inne hock,
Inne ye fpringe ye younge mannes fancie lightlie turns to thoughtf of Bock.

Choruf

O! ye Bock beere of fpringetyme if foaming withe foam,
Ye blithe gladfomme draughtfmenne now nightlie doe roam,
Ye pale ambre colore of ufual beere,
Hafs quite gotte ye goebye fince bock beere if here."

H. G. R.

From Our Book Shelf

Things Egyptian

The desecration of the tomb of Tutankhamen has been an event of great journalistic profit. Possibly there may be other benefits as time goes on. But whether these, if any, will ever justify the sacking of a sacred mortuary resting place is at least doubtful. For the moment we have a flood of pseudo-Egyptian, and although it happens to run blithely in the general course of that reversion to our unsensed but persistent pursuit of the joyous splendors of what we used to refer to quaintly as barbarism, it is likely to prove no more than a fancy, to be forgotten for the next.

Publishers of books, however, are not to be caught napping, and a small stream of Egyptological character already pushes its way athwart the ceaseless flow of ink. Of the resulting books, one turns confidently to "Social Life in Ancient Egypt,"[1] for its authorship gives a confidence not easily parted with in these days. And one is not disappointed. Here is a very simple and yet a very human and scholarly account of the ways of early Egypt,

[2] Blondel had two sons by Manon, the first, born the nineteenth of November, 1761, and died the following day. In writing his memoirs Casanova may well be pardoned a slight error in chronology in recalling events which occurred 35 years previously.

[3] *Carmina Burana.* Stuttgart, 1847.

[4] Jerkin (Cyrtelkin, Sax. of Cyrtel. a coat.) a short upper coat. Nathan Bailey.

[1] *Social Life in Ancient Egypt,* by W. M. Flinders Petrie.

where the Nile lent a rhythmic flow to life such as we know nothing of. The great river was the literal source, for without it there were there no humans. And this direct and inexpressibly simple phenomenon, understandable by all, uncomplicated by despots, politicians, bookkeepers, and educational institutions, resolved human existence into a colorful thing. The atmosphere of dread, of barbaric cruelty, of vile slavery and serfdom that has so ignorantly been conjured up as the firmament of Egyptian existence in the early days seems now to be as fraudulent as most of the other things that are taught in books, prepared for the purpose, it too often appears, of exalting ourselves and our ways, and deprecating those of others.

In a somewhat more popular form is Dr. Blackman's book.[2] It suffers a little, one feels, from a certain effort to draw smart analogies, but it is not too dull reading, by any means. Mr. J. A. Hamerton is editing the contributions of a group of specialists, including Messrs. Sayce, Petrie, Weigall, and Mackenzie.[3] The object is to produce, or really to reproduce, a picture of the ancient world. Four volumes will be required for the work and the first of these is already available. It touches upon Halicarnassus, Angkor, the Memnonium, Pompeii, Thebes, Philæ, Nineveh, and naturally the treasures of Tutankhamen. Finally there comes Professor Perry's fascinating tale of The Golden Age[4] that once was, when men hunted beauty for beauty's sake. It is a scientific work and the cited authorities are all there. But the interest, yea, the fascination, of the book lies in the theory that the golden age was not born of a romantic wish but once was in very being. It passed away because its people resorted to human sacrifice and this led to war and the loss of art as the basis of life. Egypt was the cradle of it all, and since we know what Havelock Ellis has said of dancing, and particularly of dancing in Egypt, why is not Professor Perry's tale as credible as any of the rest? Sometimes we can scarcely escape the feeling that the expression of life was once the business of life, and that beauty was the completely satisfying religion. Why else, we might inquire, is it that great beauty moves us to tears?

H. C. B.

The Spires of London

It is not always that introductions are read even by reviewers, but I read carefully all of the introduction to *Ancient London Churches* and to me it was not the least interesting part of the book, but it had nothing to do—that is for the most part—with Ancient Churches where as Dickens says, "Dead citizens in clouds of dust arise when we stamp our feet on the cold pavement and where dead citizens on other clouds of dust are exhaled in Te Deums from wheezy organs." No it had to do mostly with the limbo of Mid-Victorianism—ancient churches we can read about in Baedecker; modern churches in the newspapers, but where before has been the historian who could tell us all about what happened in churches in the forties, fifties and sixties—and what Pugin and Scott and Street and Bodley built—a period in every land too near to be history and too far away to be news. Who has ever written anything in our own country of that no man's land in architecture which began with the end of the classic revival and ended with the onslaught of Richardson, Hunt and McKim?

But *Ancient Churches* it is and *Ancient Churches* we must consider. Those who were acquainted with *Cathedrals of England, Scotland and Wales* will not be surprised at the erudition, the careful writing, the beautiful illustrations of this latest book by T. Francis Bumpus. Knowing St. Margerets, the Temple Church; St. Bartholemew's, the church of the Austin Friars; the chapel in the tower, and old Chelsea, I thought I knew my mediæval, ecclesiastical London pretty well but here is St. Ethelreda's and St. Helen's—Bishopgate and All Hallows Borking and St. Mary the Virgin and St. Dunstan's Stepney—to say nothing of St. Catherine Cree, and St. Andrews Holburn and All Hallows Tottenham—any information about which was decidedly in the nature of news. That churches which fed the imagination of the youthful Poe—which closed their doors on the pleading Wesley and which echoed the unfaltering creed of Sir Thomas More—could exist today almost in dozens and be unknown to the general, to say nothing of not uninterested architects, speaks among other things of the fecundity of the middle age and the vastness of "all that mighty" heart which we call London.

All of these venerable buildings are treated with loving care and minute detail: Mrs. Brown gives a credence, Jones and Smith rebuild a broken window. The matter of organs and church music especially interests the author. In the 18th century, it seems, London was divided into two factions; those who held for Herr Schmidt as the world's greatest organ builder and those others equally vociferous and belligerent who claimed a Mr. Harris was entitled to that distinction—a lively antiphonal to the diapasons of their creations.

Generations come and go. Lancet makes way to Decorated, Decorated to Perpendicular. Henry VIII and Cromwell uproot and destroy, but each springtime of tolerance revives the bloom and the ancient churches live on.

The second half of the book is devoted to the Wren churches. To Bumpus Sir Christopher is "a heaven born architect," "the pride of London," and his work unexcelled by those who preceded and unequalled by those who followed. Here we are on more familiar ground and we need no T. Francis Bumpus, as erudite as he may be, to point out the beauties of St. Brides, St. Mary le Bow, St. Stephen's and St. Margeret's—we are bone of their bone and flesh of their flesh—and we see their lovely daughters today, with their white fingers pointed to heaven, alike in the shady lanes of our New England villages and the broad plantations of the Carolinas.

Mr. Bumpus has written an excellent book, interesting to the quiet reader and lover of old and queer things and invaluable to the searcher for those tenderest of Architectural blossoms—ancient churches.

THOMAS E. TALLMADGE.

[2] *Luxor and Its Temples*, by A. M. Blackman.

[3] *The Wonders of the Past: The Romance of Its Antiquity and Its Splendours.*

[4] *The Children of the Sun*, by W. J. Perry.

[5] *Ancient London Churches*, Revised Edition, by T. FRANCIS BUMPUS; T. Werner Laurie, Ltd.

Inside Old Houses

"Some XVIIIth Century Designs for Interior Decorations"[1] is the title of a book of plates of details, without text, from the published works of Abraham Swan, with an introduction by Arthur Stratton, F.R.I.B.A.

Abraham Swan appears to have had more of a reputation as practical builder and wood-worker than as architect, and his four published books—*The Builder's Treasury of Staircases, A Collection of Designs in Architecture, Designs in Carpentry,* and *Designs for Chimneys*—were published for the benefit of the journeyman builder who designed and built homes for the middle classes.

His book, from which this collection of plates was taken, dealt especially with the preparation of standardized designs for homes and the decorative treatment of reception rooms, staircases and chimneys. His work was essentially that of the carpenter and joiner.

These plates are divided into five parts, which are listed as follows:

PART 1.—Designs for Interior Decorations. PART 2.—Interior Details and Chimney-Pieces. PART 3.—Designs for Staircases and Staircase Details. PART 4.—Plan and Façades of Country Houses. PART 5.—Designs for Bridges in the Chinese Taste.

Swan also supplies from his workshops many of the chimney-pieces and interior details of certain London and country houses and in the Geffrye Museum, Kingsland Road E., there are preserved panelled work and chimney-pieces which are peculiar to his manner. Some of the details are quite similar to those published in his plates.

Certain of these plates show the manner in which his decorative schemes were solved. He divided the walls into three parts, a dado or sub-base, a panelled surface and an entablature uniting wall and ceiling. He strove for good proportion, as shown in his works: when the entablature was large and the dado high, the room appeared lower than it was actually, whereas the reverse treatment gave height. He points out other rules, namely: where the frieze is enriched it should be enlarged and the architrave diminished in order that the whole entablature may not exceed its proportional part. His cornices are given a height of one eighteenth of that of the room.

Much credit is given to Swan for helping to establish and maintain the traditions of sound design in the minor domestic architecture of England during the 18th century.

W. L. RISLEY.

Groups of Houses

The architect who builds houses more than one at a time, or the person who is interested in developing low-cost houses, will find excellent material in *Small Houses for the Community.*[1] Mr. Raymond Unwin, an excellent and justly reputed authority, has some useful advice to give in the Foreword, and the author speaks from a wide experience. What has best been done in England since the war is well illustrated, but there are also fine examples of what has been done in other countries where housing has become a national issue and no less.

The patient student will find, in the complete "Specifications" and "Bills of Quantities" printed in full, something worth knowing, we imagine, no matter how familiar he may be with either of these subjects. The book is typographically excellent, the illustrations having been made from well studied photographs and the letterpress being large and readable. Altogether a book of genuine interest and worth. S. R.

[1] John Tiranti & Co., London, 1923.

[1] By C. H. Jones, A.R.I.B.A., and F. R. Yerbury, with foreword by Raymond Unwin. Crosby, Lockwood & Son, 1924.

Books Received

Electrical Measuring Instruments, by D. J. Bolton. The D. U. Technical Series. E. P. Dutton & Co. 1924.

1924 *Municipal Index.* A Yearbook for City, Town and County Officials and for all others interested in Municipal Progress and Public mprovement Activities. American City Magazine. 1924.

Book News

Bertram Grosvenor Goodhue

ANNOUNCEMENT OF THE MEMORIAL MONOGRAPH

The Press of the American Institute of Architects will issue at as an early date as is practicable the monograph on the work of Bertram Grosvenor Goodhue. The work will need no introduction to the architects of America and complete details will be announced in a later issue.

The Autobiography of an Idea

By LOUIS H. SULLIVAN

In the *Chicago Tribune's* list of "Best-sellers" for June *"The Autobiography of an Idea"* appeared as one of the three best sellers in the non-fiction field. The book is being reviewed most favorably in the public press and the first printing will soon be followed by the second, and, we hope, the third and more.

IN Indianapolis as in Chicago, reports the *Indianapolis News, "The Autobiography of An Idea"* is leading the list of "best-sellers" in the non-fiction class of books.

A System of Architectural Ornament

By LOUIS H. SULLIVAN

We are indeed happy to announce that this book has been placed, by the American Society of Graphic Arts, in the list of the "Fifty Best Books" published in the United States in 1924, and as such it will be publicly exhibited.

Masters in Architecture

This series, dealing with Inigo Jones, Chambers, Vanbrugh, and Hawksmoor, gives an excellent and comprehensive idea of the work of four eminent English architects. Other volumes are to follow.

Building Congress Notes

Seasonal Employment

The Building Owners' & Managers' Association of Philadelphia, after conferring with the Philadelphia Building Congress has taken the following action:

Resolved, that the Board of Directors of the Building Owners' and Managers' Association of Philadelphia recommend to all members and to all owners and managers of large buildings in the City of Philadelphia that they defer such of their maintenance and repair work as can be conveniently postponed until such periods during the coming winter as there might be a lull, or easing-off of conditions, in the building and construction industry.

This action is being taken to help reduce the unemployment problem when winter comes again. "Seasonal employment" is recognized as one of the evils in the labor situation. Large numbers of men, by the nature of their profession or trade, are employed only a part of the year.

A brief survey has disclosed that much repair work, now crowded in the summer months, could be done just as easily and perhaps more efficiently during the slack winter period.

The Letting of Contracts

The Selection of General Contractors and Sub-Contractors

Desirable Procedure

In the interest of the building industry and the efficient, economical, and workmanlike execution of contracts, the Boston Building Congress urges upon Owners, Architects and Engineers, the adoption of the following practices in securing estimates and awarding contracts:

(1) Do not ask for competitive approximate estimates unless adequately paid for.

(2) Furnish complete, clear and accurate plans and specifications when asking for bids.

(3) Invite only a limited number of Contractors to compete, six generally providing adequate competition.

(4) Invite for a given piece of work Contractors of substantially equal ability and standing.

(5) Invite only Contractors to whom you are willing to award the contract.

(6) Having invited bids as provided above, award the work to the low bidder, unless other considerations than price are to enter into the award, in which case make this fact perfectly clear in the notice to bidders.

(7) Where the time for the completion of the work is important, name a definite time, on which all bids shall be based. Do not invite bidders to name their own time limits as well as their prices.

(8) Eliminate as far as possible Unit Prices, Alternate Estimates and Secondary Estimates when asking for bids.

(9) Do not award a General Contract without determining in advance the Sub-Contractors to be used on the principal portions of the work.

(10) In order to determine Sub-Contractors in advance follow one of the following methods or a combination: (a) provide that the General Bidders shall name the principal Sub-Contractors they intend to use in their proposals; (b) submit to the General Bidders a list of approved Contractors for such important sub-contracts; (c) secure principal sub-bids and send a list of designated names and amounts to all General Bidders to be incorporated in their bids.

(11) Where work is covered by allowances to be adjusted after the General Contract has been awarded, reduce such items to the practicable minimum, and do not include under "Allowances" Sub-Contracts of major importance.

(12) In selecting bidders for designated bids, or allowances, or for separate contracts, give due consideration to their labor policy, according to the policy adopted for the General Contract.

(1) Approximate Estimates

Before actual bids are asked for, approximate estimates are frequently desired. A Contractor's detailed knowledge of actual costs is of value to supplement and check an Architect's or Engineer's judgment.

In asking for approximate estimates from Contractors, for the preliminary guidance of an Owner, the cost of making up such an estimate should be borne in mind, and if excessive should be paid for. A single responsible Contractor, familiar with the character of work involved and with the standard of work desired by the Architect or Engineer, can prepare an estimate which will have real value to the Owner.

The Architect or Engineer should give the Contractor as complete information, plans and instructions as possible. Approximate Estimates which are carelessly made are misleading to the Owner at the time when he most needs accurate information, and will react as unfavorably on the Architect, Engineer and Contractor as they may be annoying and expensive to the Owner.

(2) Plans, Specifications and Form of Contract

In asking for definite bids, complete plans and specifications are of course a first essential. Incompleteness, inaccuracy or conflicts in the drawings and specifications increase the cost of preparing the estimates and generally also add to the amount of the bid unless, through confusion or error, they result in mistakes that improperly reduce the estimate below a reasonable figure. In either case the result is unfortunate.

The method of handling a contract differs with the practice of the Architect or Engineer, or with the special conditions of a particular building operation, being generally one of the following:

(1) A General Contract, including all trades.

(2) A General Contract, including all trades except Plumbing, Electric, Elevators and Heating.

(3) No General Contract, each trade being let separately and handled through the office of the Architect or Engineer.

The last method is seldom used in this part of the country, though it is the rule in some cities.

In either of the first two methods there will be a large number of sub-trades handled by the General Contractor, and the method by which estimates are secured and General Contractors and Sub-Contractors selected for the work is important for all concerned, no less to the Owner and his Architect or Engineer, than to the Contractors themselves.

(3) Limited Number of Bidders

The cost of estimating is an overhead charge on the industry which has to be paid and it enters into the estimates for all buildings. It is desirable to reduce it to a minimum, and the first step is to limit the number of bidders invited. Five or six bidders will give the ample competition which the Owner desires to assure himself of the reasonableness of the Contract price. To invite ten or fifteen merely adds to the cost of estimating without adequate return.

(4) Selection of General Bidders

The careful selection of the General Contractors to be invited to figure is of the first importance and it must be recognized that all grades of ability are to be found in the list from which one must choose. It is at this point that the Owner, through his Architect or Engineer, must determine whether price alone should control the selection or whether and to what degree quality of performance is desired.

Assuming, for example, five grades of ability, it is undesirable as well as futile to ask Contractors of Grade A to figure in competition with Contractors of Grade E. This is too frequently done. If the A man becomes aware of it he generally either refuses to figure or submits a "safe" bid so high as to put him out of consideration. In either case, the Owner loses the competition which he seeks, and the A man, if he consents to bid, wastes his time.

The character of work expected should be determined and a limited group of bidders invited who are as nearly as possible of equivalent ability, and of the general calibre desired.

In selecting any but thoroughly skilled and efficient Contractors, it must be acknowledged in advance that something less than first quality work is expected and must be accepted. This applies as well to the administrative functions of the General Contractor as it does to the craftsmanship of the mechanics whom he and his Sub-Contractors employ. You cannot secure a grade of work higher than the ability of the man who performs it.

(5) Pacemakers

Sometimes a group of high grade Contractors are invited together with one of a lower grade, who is looked upon as a sort of "pacemaker." This is an undesirable and unreasonable practice. No one should be invited to bid to whom the Owner is unwilling to award the work. When a "pacemaker" is invited, either his time or that of the other bidders is being wasted.

(6) Award to Low Bidder Unless Otherwise Specially Provided

Having invited a selected group of substantially equal ability, to anyone of whom an award would be satisfactory, then under normal conditions, the Contract should be awarded to the low bidder. It should be borne in mind, however, that competition based solely on price tends to reduce the character of service and quality of work estimated on and performed and therefore to reduce the standards of performance in the industry.

Frequently the character of the work may be such that it is

impossible to select a group of bidders that are exactly of equal ability to handle it as desired, and that, up to a certain amount, a higher bid may be offset by some special qualifications of the bidder. If factors other than the amount of the bid are to be taken into consideration in making the award, this condition should be clearly stated in the notices to bidders. The usual clause reserving right to reject any or all bids and to accept any bid is a legal protection that is desirable and reasonable in all bidding, but if special conditions will enter into the award in addition to price, it is only fair to the bidders that this fact should be clearly stated in advance, in addition to the legal reservations above referred to.

(7) Time Limits

Time is often of the essence of the Contract, and a time limit for the completion of the work involved in the making of estimates. Frequently the bidders are asked to state in their bids the time within which they will complete the work. This is an undesirable practice as it adds a second element of competition and confuses the award. If a time limit, with or without forfeit and bonus, is desired, a reasonable or the necessary time should be stated in the General Conditions of the Contract Form and all bidders required to submit their bids on this basis.

After bids are received, consideration of the effect of the time limit on the price may well be discussed with the successful bidder in order to determine how an earlier or later time would affect the cost, taking into consideration the use value of the completed building to the Owner. It should not, however, be taken up with other than the successful bidder as this would open up undesirable opportunities for cutting prices on the score of time in an attempt to defeat the legitimate advantage won by the successful bidder in the original estimating.

(8) Unit Prices, Alternate Estimates and Secondary Estimates

Unit prices required as part of a bid are confusing and very often fail of their purpose. Prices for units of work not carefully and accurately defined are frequently not properly applicable to the work as it later appears; and an elaborately itemized schedule of unit prices that will fit accurately all future contingencies is cumbersome and confusing. Unit prices on general building construction should be used sparingly and with caution.

Inclusion of alternate estimates in a proposal sheet is an undesirable practice. Where many are required it adds greatly to the expense and the difficulty of preparing a bid, and injects an element of confusion into the determination of the successful bidder. The major items of cost should be analyzed by the Architect in advance, the plans prepared on a basis as nearly as possible meeting the financial requirements and any further adjustments determined in conference with the successful bidder.

Secondary estimates, after the bids are received, upon various items, usually small and often reductions, introduce the chance for bidders to revise their original bids by quoting new prices widely at variance with the value of the proposed changes. This opportunity is often taken, making in effect a second chance to bid upon the entire work. This practice is therefore faulty because it requires contractors to bid twice, the second bids carrying a greater element of gambling and price cutting, which lead to business instability. The practice should therefore be discontinued whenever possible, and changes should be handled only with the successful bidder.

(9) Determine Sub-Contractors in Advance

The reason for a General Contractor is his ability to administer the building operation effectively, executing with his own direct employees certain portions of the work and directing the various Sub-Contractors and correlating their work so that proper progress is secured. It cannot be denied that many who go by the designation of General Contractor are incompetent to perform these important functions properly. Their experience, organization and reputation based on performance, should be more carefully investigated than is frequently the case before they are invited to bid. The "separate contract" system under the Architect or Engineer is preferable to the General Contract system with an incompetent or dishonest General Contractor.

In any event, generally a large majority of the work will be done by "Sub-Contractors." Their ability to perform the work is of great importance to the Owner. It is not sufficient to rely solely on the reputation of the General Contractor for he cannot produce for the Owner work of a better quality than the abilities of his Sub-Contractors and their mechanics.

Therefore, wherever quality of work is to be considered and not merely price, it is important to select Sub-Contractors with as much care as General Contractors. Many General Contracts, however, are awarded on a lump sum without any reference to the Sub-Contractors to be used in the work. Such a method is to be condemned. Unless the Sub-Contractors are known the quality of work figured on is not clear and the award is made in ignorance of this important fact. Such a method also encourages re-figuring of Sub-Contracts after the award for the purpose of securing lower prices merely to increase the profit of the General Contractor to the detriment of the Owner's interest.

All Sub-Contractors of importance should be determined before the General Contract is awarded and should constitute a factor in the award. This can be done in various ways.

(10) Methods for Selecting Sub-Contractors

(a) Sub-Bidders Named in Proposal

The simplest way is to require the General Bidders to name for the principal trades the Sub-Bidders whom they intend to employ. These names can be reviewed and any that are not satisfactory can be changed before an award is made. It should, in such case, be made clear in the notice to bidders that the character of the Sub-Bidders will be given consideration in making the award. The Owner will then be entitled to demand better Sub-Contractors of the low bidder, or to accept a higher bid if it is based on a better grade of Sub-Bidders. A General Bidder can easily produce a low bid by the use of a group of undesirable Sub-Bidders. If the General Bidders are to be justly compared on price, the groups of Sub-Bidders must be reasonably equal in ability.

(b) List of Approved Sub-Contractors

Instead of requiring the naming of Sub-Bidders in the proposal, the Architect or Engineer may submit to the General Bidders a limited list of Sub-Contractors in each trade, any of whom will be acceptable. In making up this list consultation with the General Bidders is often desirable. This will save the time of Sub-Bidders who might not be satisfactory and will simplify for the General Bidders the securing of estimates in these trades.

(c) Designated Bids

Another method that has been used to a considerable extent is to require Sub-Bids on certain designated portions of the work, from Sub-Contractors selected as set out in the preceding paragraph, to be delivered to the Architect some days in advance of the General Bids. A list of the selected Sub-Bidders and the amounts of their bids are sent to all General Bidders a day or two in advance of the date the General Bids are due. All General Bidders are instructed to base their General Bids on the use of this list of designated Sub-Bids.

The advantage of this system is that it permits the selection of a more satisfactory list of Sub-Contractors and eliminates this often complicated problem when the General Bids are under consideration, thus expediting the selection of a General Contractor and the award of the Contract. Sub-Bidders can submit their net estimates in the assurance that they will get the Contract at the price they name if at all. It permits the General Bidders to know the Sub-Bidders on the principal parts of the work at least a day or two before their own bids are due instead of receiving them within a few hours of that time.

The objections raised to this system are that it may weaken the control of the General Contractor over the Sub-Contractors so selected; that the Architect and Owner assume certain responsibilities by such procedure not otherwise assumed; and that under this procedure a General Bidder may have to assume a Sub-Contractor that is not satisfactory to him either in ability or on personal grounds. In answer to these objections, those who have used this system testify that control over Sub-Contractors has not actually been reduced in such cases; that it is possible that some added responsibility for the Architect is involved, necessitating carefully drawn documents, but that since the Contractor has more time to survey these Sub-Bids he is in a better position to assure himself that all points are properly covered and so may reasonably be held for all contingencies. As to assumption of unsatisfactory Sub-Bids, a General Bidder is always at liberty to state that a designated Sub-Bidder is not satisfactory to him and that his bid is based on the use of another named Contractor for such work. This would always be considered if his bid was low and his objection to the Sub-Bidder reasonable. In spite of the objections cited it appears to be the best procedure to follow where a high grade of work is desired.

(d) Above Systems Combined

The above three systems may be used in combination arranging for "designated bids" on a limited number of items of major importance and providing for the naming by the General Bidders of Sub-Bidders in other less important branches of the work, or, in some cases, the naming by the Architect of an approved list of Sub-Contractors.

(11) Specialties and Allowances

Some branches of the work are of the nature of specialties on which real competition is not possible, or which involve service by cities, towns, or public service corporations not subject to estimate. In such cases, the Architect must secure such estimates as he can for the particular work desired—in some cases only a single bid perhaps being obtainable. For all such work the "designated bid" is the natural method to pursue, and the Contractor expects to have such Sub-Bidders definitely selected by the Architect.

So far as practicable definite bids on these specialties should be obtained in advance of the general Bidding. Where not practicable to do so the work may be covered by an "allowance" and figured later. It is not desirable, however, to cover many important items in this way as it leaves the General Bidder in doubt, when submitting his bid, on matters that may have an important bearing on the progress of the work.

(12) Labor Policy

In a community where there is a general trade agreement in force it is wise for an Owner to determine definitely in advance whether his work shall proceed in accordance with such agreement using organized labor, or ignoring such agreement using unorganized labor. All Contractors on a job should be of the same kind in order to prevent delays and labor disputes. An Architect or Engineer in selecting Sub-Bidders, on any of the above mentioned plans, should bear in mind the general labor policy adopted for the work.

Education

Professor Albert E. Ferran of the Massachusetts Institute of Technology, is returning to France next month to continue his work there.

In his address to the Boston Society of Architects on 6 May last, Professor Ferran spoke most interestingly on the *Ecole des Beaux Arts* and gave his views on the teaching of architecture in the United States.

"His remarks," we quote from the Bulletin of the Boston Society, "delivered partly from notes and partly extemporaneously, were followed with keen interest and absorbed attention. The speaker, who was naturally thoroughly conversant with his subject, spoke rapidly, and expressed decided views as to the methods and systems followed by our universities, pointing out the difficulties that are encountered by the academic requirements, the schedules, the hours, the credits, and many of the troubles that inevitably occur when the teaching of a fine art is made to conform to the strict rules and regulations that govern scholastic time-tables.

"In introducing his subject the Professor gave a brief outline of the *Ecole Nationale et Speciale des Beaux Arts* which was founded by Colbert in 1648, under the title of *Ecole Academique*. It received its present title in 1793. Pupils are admitted from the age of 15 to 30 years, after examination, in one of the sections of painting, sculpture and architecture. The school prepares pupils for the concours for the Grand Prix de Rome.

"The number of students has always been limited to those who were fitted by temperament and inclination to do the work required. In 1720 there were only twenty-two students although the school has been established more than seventy years. Unless the student obtains the required number of mentions and medals he is sent back to do the work over again until he does obtain them. At the age of thirty, he must leave the school.

"In 1761 Blondel started his academy, which by his *'Cours d' Architecture'* did so much to stimulate an understanding and appreciation of the art of building. In 1785 the Prix de Rome was established and Fontaine was the first *pensionnaire* of this famous institution. The speaker told of the origin of the lodge and the atelier systems, the latter by Blondel's son, the famous Pontist. During the revolution the teachers carried on the work from their private funds until the authorities saw that this was properly a government function and took it over accordingly. During four years there were some queer judgments when green grocers, coal heavers and cordwainers sat on juries, but soon the absurdity of this condition brought about the restoration of the school to its proper personnel.

"At present, there are three regular ateliers and sixteen independent ateliers. The average number of students is three hundred and fifty.

"The teaching of architecture in the United States is in a bewildering condition at the present time. There is no settled policy among our large institutions of learning, for the attempt is made to teach the student more than he can learn. After the saturation point is reached no more can be added or retained. The list of subjects that the architectural student is confronted with is appalling, and the meagre time at his disposal for *architecture* is indeed scant, perhaps a total of one hundred and fifty days in four years. Then the order in which subjects are taught is most important—the student barely receives a mere whiff of the divine afflatus during his first two years. Each year new courses are added and the proud parent, scanning the prospectuses of the various colleges of architecture sees that one university offers a course in landscape architecture, another adds town planning and a third a series of lectures on eugenics and the 'Origin of the Portcullis,'—wants his offspring to go where he, or she, as the case may be, will get the most—not realizing that only a limited amount may be absorbed, and that *architecture* is, after all, what the student must learn.

"At the close of his paper, Professor Ferran paid a glowing tribute to this country and spoke in the highest terms of the friendship that France cherishes for us. For our part, we all feel the obligation and the immeasurable debt that our architecture and our architects owe to the *Ecole des Beaux Arts*. It took Colbert and two hundred years to found the school; surely we may not despair if after a few decades we still have much to learn."

Current Activities

Meeting of the Sectional Committee of the American Engineering Standards Committee on Methods of Testing Wood at Madison, Wisconsin, 14 April. The Institute was represented at this meeting by Prof. Charles W. Killam. The meeting considered criticisms of a tentative standard for methods of testing sent out to interested and informed institutions and individuals. The purpose of the proposed standard is to insure, as soon as possible, that tests carried out in different laboratories will follow the carefully worked out methods based largely on those followed in the Forest Service, so that the results will be fairly comparable with the large number already on record there. Such standardization is particularly necessary in the case of a material like wood because of the great variation in different pieces due to moisture content, rate of growth, and defects.

In 1918 the American Society for Testing Materials adopted standard specifications for fire tests of materials and construction. These specifications were approved in 1919 as tentative American Standards by the American Engineering Standards Committee.

A meeting was held in New York City, 2 May, to organize a Sectional Committee for a study of the present specifications and to extend the scope of the standards to include specifications for fire tests of materials and structural units which constitute permanent integral parts of a finished building. The specifications as prepared to date cover only assembled materials and not units.

Pending the appointment of a representative, the Institute is co-operating through the Scientific Research Department.

Simplification of Elevated Steel Tanks on Towers: A conference was held in Washington, D. C., on 29 April under the auspices of the Division of Simplified Practice to consider certain aspects of the above subject. The Institute was represented by Mr. L. Justement.

At the present time there exists no well known specification covering the manufacture of elevated steel tanks on towers. It was the sense of the conference that because of the several engineering problems involved in tank and tower design the co-operation of the American En-

gineering Standards Committee should be obtained in the development of standard specifications covering design, construction and installation.

Based upon a consideration of popular demand, it tentatively recommends that the recognized capacities of elevated steel towers be reduced to the following capacities in U. S. gallons: 5,000, 10,000, 15,000, 20,000, 25,000, 30,000, 40,000, 50,000, 60,000, 75,000, 100,000, 150,000, 200,000, 300,000, 500,000.

Committee Appointments

The personnel of a number of the Institute committees has already been selected, and the men appointed to these bodies have already signified their acceptance of their appointments.

The members of the new Executive Committee are as follows: D. Everett Waid, Edwin H. Brown, Abram Garfield, William L. Steele, and Charles Herrick Hammond.

The new Judiciary Committee is composed of Messrs. William L. Steele, *Chairman;* W. E. Fisher, and William J. Sayward.

The Board of Examiners—Messrs. Edward W. Donn, Jr., *Chairman;* Delos H. Smith, and Louis A. Simon—is the same group which has served for the past two years.

At the meeting of the Board of Directors, which followed the Convention, President Waid, in conference with the Board, decided to withhold the appointment of new Standing and Special Committees for the time being. This will give opportunity for mature consideration, which was not possible on the day following the Convention.

In the meantime the President and the Board are asking the present committee chairmen and members to continue to perform their respective duties.

Announcement of new appointments, or reappointments, will be made in due course.

Letters to the Editor

Modern German Architecture

To the Editor of the Journal:

Mr. Irving K. Pond is quite right in saying that some German architectural work has gone wild and is really cast-iron. No wonder! The war and post-war times in this country are well fit to create a thorough nervous breakdown of a great nation. Naturally the soul is irritated and will seek its way on twisted roads; however, I can assure Mr. Pond there is sanity still alive in the architectural world over here too. Therefore, it would seem "square" not only to reproduce the cast-iron trials but give the sane work a chance also—sane work which is struggling for economic and artistic solutions both.

Hans J. Philipp.

Itzehoe, Germany.

Obituary

Louis Holmes Boynton

Elected to the Institute in 1913
Died at Chicago, Ill., 19 April, 1924

Professor Louis Holmes Boynton, of the faculty of the College of Architecture of the University of Michigan, was born in 1867 at Guilford, Connecticut, and as a special student studied architecture at the Massachusetts Institute of Technology. Afterward he entered the office of Peabody and Stearns, in Boston, winning the Rotch Traveling Scholarship in Architecture in 1896, which gave him two years of study in Europe. Part of this time was spent in Italy where in 1897 he was married. After his return to the States he was for a time with Shepley, Rutan and Coolidge, Boston, and—later—McKim, Mead and White and Cass Gilbert, New York City. With Mr. Gilbert his principal work was on the Union Club and on the New York Customs House. From 1908 to 1912 he practiced in New York City, and then went to the University of Michigan, to teach in the field of architectural design, in which his training and experience on important undertakings was of great value. As a practitioner he was very active and has done some of Ann Arbor's most beautiful buildings including the new South University Avenue public school, residences and fraternity houses.

He is survived by Mrs. Boynton and three children, Louise, Lucia and George, and by three brothers.

Professor Boynton had been on the Board of Directors of the Ann Arbor Art Association since 1917, and was its president in 1920-21. His loss will be keenly felt by all who had the privilege of knowing him whether as a friend, associate or teacher.

William D. Hewitt, F. A. I. A.

Elected to Associate Membership in the Institute in 1901
Elected to Fellowship in 1909
Died at Philadelphia, Pa., 23 April, 1924

(Further notice later)

Booth Traveling Fellowship

The first award of the George C. Booth Traveling Fellowship in Architecture has been made by the College of Architecture of the University of Michigan. Of the nine competitors who finished, the designs of two were of such equal merit that the jury decided to divide the $1200 income of the Fellowship between Marion F. Blood, a member of the Class of 1924 and Ralph R. Calder who graduated in 1923. Both have had office experience in addition to academic training and both are students of high scholarship.

To the $600 received by each winner, Mr. Booth has generously added $500; by this gracious gift it thus becomes possible for the school to send two students abroad for a stay of approximately one year.

Structural Service Department

LEROY E. KERN, *Technical Secretary*

In connection with the work of the Committee on Structural Service of the American Institute of Architects and in collaboration with other professional societies and organized bodies having the same objective—improvement in building materials and methods and better shelter for humanity in all its manifold vocations and avocations

Abstracts

It is the purpose of the Structural Service Committee and THE JOURNAL *jointly to give in this division, each month, brief abstracts of all publications by the Government Departments and Bureaus, University and other research laboratories, States and Associations, which contain fresh information in regard to materials or methods employed in construction and thus accord architects and others a convenient means of keeping themselves conversant with rapidly expanding knowledge in the technique of construction.*

Water Pipe Sizes for Plumbing Fixtures, Branches and Mains (29d) (*By Walter S. Timmis, Reprint from Journal of American Society of Heating and Ventilating Engineers.*) (Continued from page 300, June issue.)

TABLE 6. SHOWING WATER PRESSURE REQUIRED TO DELIVER WATER TO TOP OF VERTICAL RISER WITH 15 LB. PRESSURE AT THE TOP BRANCH

Vertical rise of water from main to highest fixture branch	Static head in lb. per sq. in.	Water pressure in lbs. required to deliver water to top of riser with 15 lb. terminal pressure			
		Pressure drop per 100 ft.			
		5 lb.	7 lb.	10 lb.	20 lb.
0	0	15	15	15	15
10	4.33	20.5	20.7	21	22
20	8.66	25	25.4	26	28
30	12.99	29.5	30.1	31	34
40	17.32	35	35.8	37	41
50	21.65	39.5	40.5	42	47
60	25.99	44	45.2	47	53
70	30.32	49.5	50.9	53	60
80	34.65	54	55.6	58	64
90	38.98	58.5	60.3	63	72
100	43.31	64	66	69	79
110	47.64	68.5	70.7	74	85
120	51.97	73	75.4	79	91
130	56.30	77.5	80.1	84	97
140	60.63	83	85.9	90	104
150	64.96	87.5	90.5	95	110

NOTE: The water pressures given in above tables are the pressures at the base of the riser, necessary to deliver water to top of riser with a terminal pressure of 15 lb., when discharging the number of gallons per minute called for in Table 5, at the pressure drop indicated.

The following examples will be given, using Table 5:

EXAMPLE: What are the sizes required for mains and branches in a building 100 ft. high, supplied with a water pressure of 75 lbs. per sq. in. with 100 gal. of water per minute required on each floor?

This is worked out in Table 3 and gives the pipe sizes for the main riser with a 10 lb. drop for 100 ft. of run and shows that a 3 in. main, reduced to 2 in., would be required: branches to the various groups of fixtures can be taken from Table 5, from which it will be seen that on the top floor it will be necessary to use a 1½ in. branch to carry 75 gal. per min. with a pressure drop of 30 lb. but that at 50 ft. vertically from the supply, a 1¼ in. branch pipe will carry 74 gal. per minute, therefore 1¼ in. pipe could be selected for this branch. Assuming that the pressure drop in the main riser is 10 lb. per 100 ft. run and the pressure drop on the 100 ft. as given in column 2 of Table 5 is 43.31 lb., making a total of 58.31 lb.; it will be seen that 75 lb.—58.31 lb., which equals 16.59 lb., is the amount of pressure over and above that required, and that this pressure can be utilized to overcome the friction drop in the main feed line running from the source of supply to the base of the riser.

From Table 3 it is found that 240 gal. per min. will flow at the first floor, and assuming that this water supply is to be brought in a main 300 ft. long, the table of 5 lb. drop of Table 6 may be used, which will show that a 3½ in. supply would be necessary.

Table 2 is a condensed form of Table 1, omitting the number of gallons per fixture, carrying the number of fixtures from 1 to 16.

Table 3 gives a method for computing the sizes of mains and risers and the pipe sizes given are based upon a pressure drop in the main riser of 10 lb. per 100 ft. of run; other values such as 5 lb. or 7 lb. can be used from Table 5 if it is found advisable on account of very long runs.

It will be seen that 60 per cent of the total amount of water required for all the fixtures on any floor is given as the factor of use and that a further reduction is made by deducting 10 per cent on each floor below the top floor until 40 per cent is reached. This of course is a matter of judgment and experience, but the volume of flow will be adequate for the average case, provided the pipe sizes selected are ample for the drop in pressure admissible.

WHEN TANK IS ON ROOF

If tank is elevated about 35 ft. above highest fixture, which would be about 25 ft. above the roof, all the computations given herein will apply for branch connections and main risers except that the main riser will have its greatest diameter at the top. It will be seen that 35 ft. elevation will give the necessary 15 lb. pressure at the highest fixture.

FRICTION IN ELBOWS

Friction caused by elbows should be added to straight pipe friction. Each elbow in a line will add friction equal to a length of straight pipe at forty times the diameter of the pipe approximately as follows:

Pipe size	¾	1	1¼	1½	2	2½	3	3½	4
Equivalent length of straight pipe in ft.	2.5	3.3	4.1	5	5	8.3	10	11.7	13.3

The pressure loss due to friction in the main leading to base of riser can readily be added to the pressure required at the base of a riser, thus:

Required—the size of riser and main for a 10-story building 100 ft. high where the water use per floor as given by Table 1 for fixtures aggregates 100 gal. per floor.

The computations as given in Table 3 show that the water flow required on the various floors is as follows:

TABLE 7. GIVING EXAMPLE OF RISER SIZES FOR DIFFERENT PRESSURE DROPS PER 100 FT. RUN

Floor	Gal. per min.	5 lb.	7 lb.	10 lb.	20 lb.
10	60	2	2	2	1½
9	108	2½	2½	2½	1½
8	144	3	3	2½	2
7	168	3½	3	3	2½
6	180	3½	3	3	2½
5	180	3½	3	3	2½
4	184	3½	3	3	2½
3	192	3½	3	3	2½
2	216	3½	3	3	2½
1	240	3½	3½	3	2½

If the system of mains and risers is based upon 10 lb. pressure drop per 100 ft. run, the pressure required at base of riser when water is flowing will be 69 lb., see Table 6 at 100 ft. height; or at 20 lb. drop it would be 79 lb., while at 5 lb. drop it would only be 64 lb.

Pressure required at the main 100 ft. away with 10 lb. drop per 100 ft. would be $69 + 10 = 79$ lb., or 50 ft. away $69 + 5 = 74$ lb.

WATER SUPPLY FORMULA

CF = Cu. ft. per min. discharged
G = Gal. per min. discharged
H = Friction head of water in feet = pressure × 2.31; if water is raised vertically, deduct number of feet raised, from head due to pressure
L = Length of pipe in feet, including horizontal and vertical runs.

$$CF = 0.16 \sqrt{\frac{(3d)^5 \times 3\ H}{L}} \qquad (1)$$

$$G = 1.2 \sqrt{\frac{(3d)^5 \times 3\ H}{L}} \qquad (2)$$

$$H = \frac{(0.16 \times CF)^2 \times L}{(3d)^5} \qquad (3)$$

$$H = \frac{(1.2\ G)^2 \times L}{(3d)^5} \qquad (4)$$

The above formulæ neglect the head due to entry, which need not be computed except when L is very short.

H_1 = head due to entry in feet

$$H_1 = \frac{(0.83\ G)\ 2}{(d^2 \times 13)} \qquad \text{or } H_1 = \frac{(0.16\ CF)\ 2}{(d^2 \times 13)}$$

Example—

Required the discharge of a 2 in. main with pressure 30 lb. 100 ft. horizontal run and 30 ft. vertical run.

$$H = 30 \times 2.31 - 30 = 39.3$$

Formula (2) $$G = 1.2 \sqrt{\frac{(3 \times 2)^5 \times 3 \times 39.3}{100 \times 30}} = 100.8$$

In the above case the head due to entry would be

$$H_1 = \frac{(0.83 \times 100.8)\ 2}{(2 \times 2 \times 13)} = 2.56 \text{ ft.}$$

Usually this can be neglected except for very close calculations.

Poultry Houses (351) (*U. S. Department of Agriculture, Farmers' Bulletin No.* 1113, *by Alfred R. Lee*). Poultry houses should be dry, well ventilated, free from drafts, with plenty of sunshine and room enough to allow the birds to move about with freedom and comfort. These factors are more important than the kind or style of building used. No fixed type of building can be recommended as superior to all others if proper ventilation, light and other essentials referred to are provided.

The houses should be located if possible on high or sloping ground and always on dry and well-drained soil. The house should face the south, as it gives more sunlight for a longer part of the day, especially in winter, when sunlight is necessary for the comfort of the birds. The proper dimensions of a poultry house depend both on the number of fowls and the locality. On a farm or where the birds can be out of doors nearly every day in the year, about 2½ square feet of floor space per bird in flocks of 20 is enough, but in a village or city or in a climate where there is a good deal of snow, making it necessary to confine the birds closely, 4 or 5 square feet per bird should be allowed.

Floors. Poultry houses may be built with or without floors. In either case they should be dry. Dampness is fatal to both fowls and chicks. If the house is on dry sandy soil, a dirt floor is usually quite satisfactory, but as a rule it is more damp than board or cement floors. If board floors are used they should be both tight and smooth so as to make them dry and easy to clean. If possible they should be 8 or 10 inches from the ground to allow a circulation of air and to prevent rats from harboring under them. Cement floors, especially for large houses, are quite satisfactory.

Roosts. Roosts should always be placed at the back of the house away from windows or openings. Dropping boards should be built about 2 feet or 2 feet 6 inches from the floor (never more than 2 feet 6 inches). The roosts should be about 8 inches above the dropping boards and 15 inches apart. From 8 to 10 inches of roosting space should be allowed for each hen. The roosts should be hinged to the back wall so that they may be raised and both the roosts and dropping boards cleaned. Roosts should never be built one above the other, but should all be of the same height.

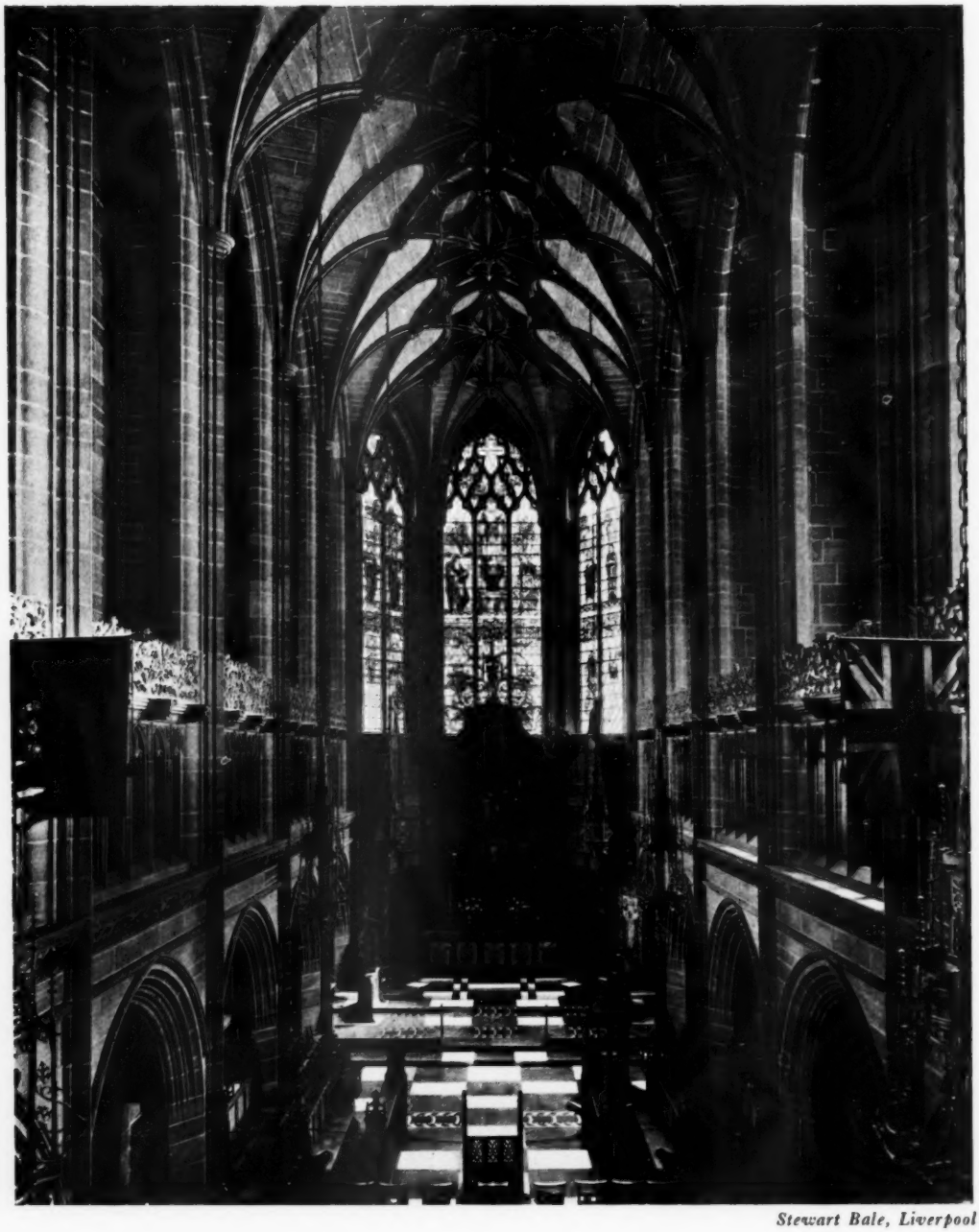
Nests. There should be a nest for every 4 hens. Nests should be at least 15 inches square and may be built singly or in rows and fastened to the side of the building or placed under the dropping boards. If possible, however, nests should be somewhat secluded or darkened as hens will seek such nests more readily.

Homemade Silos (351) (*U. S. Department of Agriculture, Farmers' Bulletin* 855, *by Helmer Rabild and K. E. Parks. Revised August,* 1922. *Size,* 6″ x 9″. *Pages,* 55. *Illustrated*). This bulletin describes the essential features and construction of four common types of silos.

Commercial Garages (35m) (*Concrete Commercial Garages, Portland Cement Association. Size* 6″ x 9″, *pages* 19, *illustrated*). Synopsis: Favorable insurance rates for fireproof construction, economies from other sources, features of commercial garage design, some building code requirements.

Standardizing Schools (35z19) (*Regulations for Standardizing the Common Schools, issued by the Department of Public Instruction, Des Moines, Iowa. Pages* 20, *size* 6″ x 9″). An official rating card is issued for Iowa schools, and in order to become standardized a rural school must have a rating of 80 per cent from this score card for the first year, 85 per cent the second year, and 90 per cent for every year thereafter.

This booklet describes the requirements which must be met in connection with grounds and outbuildings; the school house; equipment and care of the schoolroom; library and supplementary readers; the teacher and the school and community activities.



Stewart Bale, Liverpool

THE CATHEDRAL CHURCH OF CHRIST—LIVERPOOL
THE LADY CHAPEL—LOOKING EAST
(Consecrated June, 1910)
G. GILBERT SCOTT, R.A., F.R.I.B.A., *Architect*